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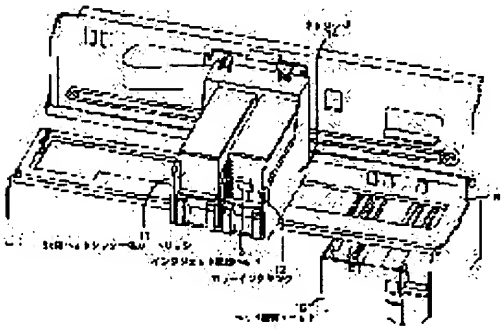
(54) INK JET RECORDER, INK TANK THEREFOR, AND INK JET CATRIDGE TO BE EQUIPPED EXCHANGABLLY TO INK JET RECORDER



(57)Abstract:

PROBLEM TO BE SOLVED: To realize high image quality while various features of an image are satisfied by a method wherein an appropriate ink tank for holding a plurality of kinds of recording liquid and an image quality improving liquid is equipped to an appropriate ink jet recording head.

SOLUTION: A head tank integrated cartridge 11 is provided wherein two kinds of recording liquid such as black ink and image quality improving liquid having a function for improving image quality without containing a coloring constituent and image durability, are contained, and an ink tank 12 holding an ink jet recording head 13 and two kinds of recording liquids inside, are integrally formed. The image quality improving liquid has a function for improving image characteristics such as a coloring property, records density, a fixing property, water resistance, weather fastness, etc., on record media of a broad range kind, As an example, by combining polyallylamine aqueous solution as a main constituent with ink in which dye is dissolved on a medium to be recorded, the image durability is principally improved.

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CLAIMS

[Claim(s)]

[Claim 1] The ink jet recording head which breathes out a record drop to recorded media and forms an image, It has an ink tank holding two or more sorts of recording ink supplied to this ink jet recording head. One sort in said two or more sorts of recording ink They are the ink jet recording device which is the improvement liquid in image quality with the function which improves the image quality and image robustness which do not contain a coloring component, and this ink tank for equipments. The ink tank having said improvement liquid in image quality is arranged at the scanning direction edge of said ink jet recording head. The ink jet recording device characterized by breathing out said improvement liquid in image quality first on the pixel on recorded media, and breathing out the ink which contains a coloring agent continuously on the same pixel, and this ink tank for equipments.

[Claim 2] Said improvement liquid in image quality is the ink jet recording device according to claim 1 characterized by being held in the ink tank of at least one sort and one in the ink containing the coloring agent of two or more colors, and supplying said ink jet recording head, and an ink tank for these equipments.

[Claim 3] The ink jet recording head which breathes out a record drop to recorded media and forms an image, In the same color as the ink of two or more colors which held the ink supplied to this ink jet recording head, and were held in the ink tank with a removable configuration, and said ink tank They are an ink jet recording device with the ink of two or more concentration in which an ink color differs from pigment concentration, and this ink tank for equipments. Each ink of said two or more colors and non-two or more concentration is built in in the ink tank of the same one apparatus. The amount of ink of light ink with low color or pigment concentration is the ink jet recording device characterized by being held more in an ink tank at the large quantity compared with the amount of ink of the dark ink of the same color, and an ink tank for these equipments.

[Claim 4] The ink color of the ink built in in said ink tank is the ink jet recording device according to claim 3 which are three colors of yellow, a Magenta, and cyanogen and is characterized by having ink of two or more concentration of two or more sorts of shades at least about a Magenta and a cyanogen color, and an ink tank for these equipments.

[Claim 5] The ink jet recording head which breathes out a record drop on recorded media and forms an image, The ink tank which holds the ink supplied to this ink jet recording head, and has a removable configuration, Have the ink of two or more colors held in said ink tank, and ink of two or more concentration in which an ink color differs from pigment concentration in the same color. The ink capacity of each ink which is an ink jet recording device and this ink tank for equipments, and has two or more concentration differs, respectively. While an ink kind with little capacity is arranged at the anterior part of the ink tank wearing direction and the ink kind with

much capacity is arranged at the posterior part of the ink tank wearing direction, the ink feed hopper of an ink kind with much said capacity The ink jet recording device characterized by being arranged near the ink feed hopper of an ink kind with little said capacity, and this ink tank for equipments.
[Claim 6] The sheathing member of said ink tank is the ink jet recording device according to claim 1 to 5 which is the Plastic solid of polypropylene and is characterized by having a rubber seal member at the ink jet recording head flank of the ink joint section with the ink jet recording head of this ink tank, and an ink tank for these equipments.
[Claim 7] In the ink jet recording device which uses each ink tank of an exchangeable different class alternatively the ink tank holder of said ink jet recording head -- receiving -- respectively -- attachment and detachment -- While being able to fit in at the complementation to said different kind of each ink tank, and wearing combination respectively predetermined to each applied part of the holder of each ink tank of business To wearing combination other than predetermined [said], 6 is [claim 1 characterized by having the engagement means of fitting impossible thru/or] the ink jet recording device of a publication, and an ink tank for these equipments either.
[Claim 8] Said different kind of each ink tank is the ink jet recording device according to claim 7 characterized by being 3 color color ink tank and a shade 6 color color ink tank, and an ink tank for these equipments.
[Claim 9] the ink-jet recording head which carries out the regurgitation of the improvement liquid in image quality to the ink-jet recording head which carries out the regurgitation of the black recording ink in the ink-jet recording apparatus which has the ink-jet recording head of the color type which breathes out the improvement liquid in image quality which improves image quality and image robustness at reacting with this recording ink excluding the recording ink and the coloring component containing black of two or more colors to recorded media, and forms an image -- said equipment -- receiving -- attachment and detachment -- the ink-jet recording apparatus characterized by to be constituted by one as an exchangeable ink-jet cartridge.
[Claim 10] Liquid other than the black recording ink in said ink jet recording device and the improvement liquid in image quality is an ink jet recording device according to claim 9 characterized by being yellow ink, Magenta ink, and cyanogen ink.
[Claim 11] each ink jet recording head which carries out the regurgitation of said yellow ink, Magenta ink, and the cyanogen ink -- said equipment -- receiving -- attachment and detachment -- the ink jet recording device according to claim 10 characterized by being constituted by one as an exchangeable ink jet cartridge.
[Claim 12] Said ink jet cartridge is an ink jet recording device given in claim 9 it has the ink tank for holding said recording ink, and this ink tank is more nearly removable than said ink jet cartridge thru/or any 1 term of 11.
[Claim 13] Said ink tank is an ink jet recording device according to claim 12 whose each it is divided for every recording ink and is removable.
[Claim 14] It is the ink jet cartridge with which it is equipped exchangeable to the ink jet recording apparatus of the color type which breathes out the improvement liquid in image quality which improves image quality and image robustness at reacting with this recording ink excluding the recording ink and the coloring component containing black of two or more colors to recorded media, and forms an image. This ink jet cartridge black recording ink The ink jet cartridge characterized by having in one an ink tank holding the ink tank holding the ink jet recording head and black recording ink which carry out the regurgitation of the improvement liquid in image quality to the ink jet recording head which carries out the regurgitation, and the improvement liquid in image quality.

[Claim 15] The ink jet recording device according to claim 14 said ink tank is more nearly removable than said ink jet cartridge.
[Claim 16] The ink jet cartridge according to claim 15 whose ink tank holding the ink tank holding said black recording ink and the improvement liquid in image quality is independently removable to an ink jet cartridge respectively.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to an ink jet recording apparatus and this ink tank for equipments about a recording apparatus.
[0002]
[Description of the Prior Art] In the recording device according to the conventional ink jet recording method, the ink containing the color as a coloring component is held in an ink tank as recording ink, the ink in an ink tank is supplied to an ink jet recording head, and the image is formed by carrying out the regurgitation of the ink on recorded media.
[0003]
[Problem(s) to be Solved by the Invention] However, if it was in this kind of recording device, it was very difficult for many image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, to change according to the class of record medium, and to realize a formation image satisfied with the record medium of all classes. Furthermore, in order to realize high definition of a photograph tone, for example, magnitude of a record drop will be made small, it will be necessary to raise recording density, the fall of the record engine performance which originates in the nozzle at the time of ink jet recording head manufacture and the improvement in precision of the orifice section inevitably, and the manufacture yield will arise, and it will lead also to the fall of a recording rate further.
[0004] This invention was made in view of the above aspects of affairs, and it aims at offer of the means for realizing high definition while satisfying said many image properties by equipping a proper recording head with a proper ink tank.
[0005]
[Means for Solving the Problem] For this reason, in this invention, it is going to attain said purpose by offering one ink jet record of each following item (1) - (16), and this ink tank for equipments.
[0006] (1) The ink jet recording head which breathes out a record drop to recorded media and forms an image, It has an ink tank holding two or more sorts of recording ink supplied to this ink jet recording head. One sort in said two or more sorts of recording ink They are the ink jet recording device which is the improvement liquid in image quality with the function which improves the image quality and image robustness which do not contain a coloring component, and this ink tank for equipments. The ink tank having said improvement liquid in image quality is arranged at the scanning direction edge of said ink jet recording head. The ink jet recording device with which said improvement liquid in image quality is first breathed out on the pixel on recorded media, and the ink which contains a coloring agent continuously is breathed out on the same pixel, and this ink tank for equipments.
[0007] (2) said -- image quality -- improvement -- liquid -- plurality -- a color -- a coloring agent -- containing -- ink -- inside -- at least -- one -- a sort -- one -- ink -- a tank -- inside -- holding --

having -- said -- an ink jet -- a recording head -- supplying -- having -- the above -- (-- one --) -- a publication -- an ink jet -- a recording device -- and -- this -- equipment -- ** -- ink -- a tank .
[0008] (3) The ink jet recording head which breathes out a record drop to recorded media and forms an image, In the same color as the ink of two or more colors which held the ink supplied to this ink jet recording head, and were held in the ink tank with a removable configuration, and said ink tank They are an ink jet recording device with the ink of two or more concentration in which an ink color differs from pigment concentration, and this ink tank for equipments. Each ink of said two or more colors and non-two or more concentration is built in in the ink tank of the same one apparatus. The amount of ink of light ink with low color or pigment concentration is the ink jet recording device currently held more in the ink tank at the large quantity compared with the amount of ink of the dark ink of the same color, and an ink tank for these equipments.
[0009] (4) said -- ink -- a tank -- inside -- building -- having -- ink -- ink -- a color -- yellow -- a Magenta -- cyanogen -- three -- colors -- it is -- at least -- a Magenta -- cyanogen -- a color -- being related -- a shade -- two -- a sort -- more than -- plurality -- concentration -- ink -- having -- the above -- (-- three --) -- a publication -- an ink jet -- a recording device -- and -- this -- equipment -- ** -- ink -- a tank .
[0010] (5) The ink jet recording head which breathes out a record drop on recorded media and forms an image, The ink tank which holds the ink supplied to this ink jet recording head, and has a removable configuration, Have the ink of two or more colors held in said ink tank, and ink of two or more concentration in which an ink color differs from pigment concentration in the same color. The ink capacity of each ink which is an ink jet recording device and this ink tank for equipments, and has two or more concentration differs, respectively. While an ink kind with little capacity is arranged at the anterior part of the ink tank wearing direction and the ink kind with much capacity is arranged at the posterior part of the ink tank wearing direction, the ink feed hopper of an ink kind with much said capacity The ink jet recording device arranged near the ink feed hopper of an ink kind with little said capacity, and this ink tank for equipments.
[0011] (6) The sheathing member of said ink tank is the above (1) which is the Plastic solid of polypropylene and has a rubber seal member in the ink jet recording head flank of the ink joint section with the ink jet recording head of this ink tank thru/or an ink jet recording device given in either of (5), and an ink tank for these equipments.
[0012] (7) In the ink jet recording device which uses each ink tank of an exchangeable different class alternatively the ink tank holder of said ink jet recording head -- receiving -- respectively -- attachment and detachment -- While being able to fit in at the complementation to said different kind of each ink tank, and wearing combination respectively predetermined to each applied part of the holder of each ink tank of business the above (1) equipped with the engagement means of fitting impossible to wearing combination other than predetermined [said] thru/or (6) -- an ink jet recording device given in either, and this ink tank for equipments.
[0013] (8) Said different kind of each ink tank is the ink jet recording device of the aforementioned (7) publication which are 3 color color ink tank and a shade 6 color color ink tank, and an ink tank for these equipments.
[0014] (9) the ink-jet recording head which carries out the regurgitation of the improvement liquid in image quality to the ink-jet recording head which carries out the regurgitation of the black recording ink in the ink-jet recording apparatus which has the ink-jet recording head of the color type which breathes out the improvement liquid in image quality which improves image quality and image robustness at reacting with this recording ink excluding the recording ink and the coloring component containing black of two or more colors to recorded media, and forms an image -- said equipment -- receiving -- attachment and detachment -- the ink-jet recording

apparatus constituted by one as an exchangeable ink-jet cartridge.
[0015] (10) Liquid other than the black recording ink in said ink jet recording device and the improvement liquid in image quality is an ink jet recording device given in the above (9) which is yellow ink, Magenta ink, and cyanogen ink.
[0016] (11) each ink jet recording head which carries out the regurgitation of said yellow ink, Magenta ink, and the cyanogen ink -- said equipment -- receiving -- attachment and detachment -- an ink jet recording device given in the above (10) constituted by one as an exchangeable ink jet cartridge.
[0017] (12) Said ink jet cartridge is an ink jet recording device the above (9) it has the ink tank for holding said recording ink, and this ink tank is more nearly removable than said ink jet cartridge thru/or given in either of (11).
[0018] (13) Said ink tank is an ink jet recording device given in the above (12) which it is divided for every recording ink and is removable.
[0019] (14) Breathe out the improvement liquid in image quality which improves image quality and image robustness at reacting with this recording ink excluding the recording ink and the coloring component containing black of two or more colors to recorded media. It is the ink jet cartridge with which it is equipped exchangeable to the ink jet recording apparatus of the color type which forms an image. This ink jet cartridge is an ink jet cartridge which has one for the ink tank holding the ink tank holding the ink jet recording head and black recording ink which carry out the regurgitation of the improvement liquid in image quality to the ink jet recording head which carries out the regurgitation of the black recording ink, and the improvement liquid in image quality.
[0020] (15) An ink jet recording device given in the above (14) said ink tank is more nearly removable than said ink jet cartridge.
[0021] (16) An ink jet cartridge given in the above (15) which is independently removable to an ink jet cartridge respectively.
[0022]
[Function] While satisfying many image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, in the record medium of all classes by adopting the above this invention configurations, it also becomes possible further to realize high definition of for example, a photograph tone.
[0023] Moreover, it can insert without fear of incorrect wearing of a proper ink tank to a proper ink recording device certainly.
[0024]
[Embodiment of the Invention] Below, two or more examples explain the gestalt of operation of this invention at a detail based on a drawing.
[0025]
[Example]
(Example 1) The ink jet recording head of one suitable example which starts this invention at drawing 1 , and the arrangement perspective view of an ink tank are shown. In drawing, 11 is really [head tank] in which the ink tank which contains two sorts of recording ink of the improvement liquid in image quality with the function which improves the image quality and image robustness which do not contain black (Bk) ink and a coloring component, and holds an ink jet recording head and two sorts of recording ink inside was formed in one a cartridge.
[0026] The improvement liquid in image quality has the function which raises image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, on the record medium of a wide range class, the poly allylamine (it is hereafter

described as "PAA") water solution is used as a principal component as an example, it is coalescing in the ink which dissolved the color on recorded media, PAA and a color adsorb, and it has the special feature that image robustness mainly improves.
[0027] 12 is a color ink tank which holds the (Yellow Y) (Magenta M) (cyanogen C) 3 color ink containing the color as a coloring component inside. 13 is the color ink tank 12 and the ink jet recording head for color picture formation formed removable. Furthermore, in drawing 1 , 14 is carriage with which it is equipped with the head for record, and 15 is the head recovery unit by which the suction pump for attracting ink was incorporated from two or more orifices at the time of the head cap which prevents the ink desiccation from two or more orifices which carry out the regurgitation of the ink formed in the head point, and the malfunction of a head. 16 is a feed side where a record form is conveyed.
[0028] It is above really [head tank] for Bk equipped with a cartridge 11 and the ink jet recording head 13 for colors which coalesced in the color ink tank 12 on carriage 14 at a horizontal single tier. As an example, the improvement liquid in image quality which really [head tank] for Bk has the function which improves the image quality and image robustness which do not contain a coloring component in a cartridge 11 is arranged the right-hand side in drawing by drawing 1 .
[0029] Carriage 14 makes the location on the recovery unit 15 the home position, and printing is started by beginning to scan leftward in drawing. Recorded media are a regular paper, and when printing using the improvement liquid in image quality with the function which improves image robustness etc., printing is performed only to a scan uni directional leftward at the time of the scan to the left. Therefore, Bk ink and the next which the improvement liquid in image quality with the function which improves image robustness etc. usually reaches the target in the paper first, then contain the color as a coloring material are usually reached in the paper in order of cyanogen, a Magenta, and yellow ink.
[0030] By thus, the improvement liquid in image quality usually being first breathed out by the pixel in the paper, and the ink which contains a coloring agent continuously being breathed out on the same pixel, i.e., the ink containing a coloring material reaching the target on the field where the improvement liquid in image quality was always imprinted, At the time of each color formation, a uniform image property can be acquired in each color, and image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, can be raised to homogeneity in each color in the record-medium top of a wide range class.
[0031] Drawing 2 is really [head tank] for Bk the perspective view of a cartridge 11. In drawing 2 , 21 is the regurgitation chip with which the top plate of the piece by which two or more nozzles and orifices for carrying out the regurgitation of the record drop were formed in two trains and the interior, two heater boards on which two or more heaters for generation of heat which are the energy generation section for carrying out the regurgitation of the record drop were formed, and two springs for immobilization which fix each heater board to a top plate were assembled in one.
[0032] 22 builds in two sorts of recording ink of the improvement liquid in image quality which has in the interior the function which improves the image quality and image robustness which do not contain Bk ink and a coloring component, and is an ink tank to hold. The regurgitation chip 21 and the ink tank 22 of each other are fixed in one.
[0033] The near side in drawing in the ink tank 22 and Bk ink are arranged for the improvement liquid in image quality at tales doses at the ****** side, respectively. Two sorts of each ink is open for free passage in the regurgitation chip 21, and the near side in drawing in the regurgitation chip 21 and Bk ink are led to the liquid room by the side of ****** for the

improvement liquid in image quality. 23 is an orifice train only for the improvement liquid in image quality, 24 is an orifice train only for Bk ink, and each liquid is breathed out according to an individual from the orifice train of two trains according to recording information, and reaches the target on recorded media. as mentioned above, the thing for which such a configuration is taken -- the beginning -- the improvement liquid in image quality -- Bk ink reaches the same pixel on recorded media continuously.

[0034] Drawing 3 is the perspective view of the ink jet recording head for colors, and a color ink tank. In drawing, 31 is the regurgitation chip with which one top plate with which two or more nozzles and orifices for carrying out the regurgitation of the record drop were formed in one train and the interior, one heater board on which two or more heaters for generation of heat which are the energy generation section for carrying out the regurgitation of the record drop were formed, and one spring for immobilization which fixes this heater board to a top plate were assembled in one.

[0035] 32 builds 3 color ink of Y, M, and C in the interior, and is a color ink tank to hold and which was formed in one. 33 is an ink tank holder with which the ink jet recording head for colors of each other is being fixed by **** or the heat caulking in one while the color ink tank 32 is detached and attached.

[0036] In order of C ink, M ink, and Y ink, each color ink is built in tales doses in the color ink tank 32 from the near side in drawing, and by equipping with the color ink tank 32 in the ink tank holder 33, three sorts of ink is open for free passage in the regurgitation chip 31, and is led to the liquid room where the back side in drawing in the regurgitation chip 31 was carried out 3 color separation.

[0037] 34 is the orifice train of the single tier in which Y, M, and C each color ink carry out the regurgitation, and each liquid is breathed out according to an individual according to recording information, and reaches the target on recorded media. As mentioned above, by taking such a configuration, the improvement liquid in image quality is really [head tank] for Bk which was first explained by drawing 2 breathed out from a cartridge, and Y, M, and C each color ink reach the target on the same pixel on recorded media continuously.

[0038] As previously explained in this example, it is five kinds of ink (although it has composition which carries out the regurgitation of the liquid), Bk ink, the improvement liquid in image quality, yellow ink, Magenta ink, and cyanogen ink. here, the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality is formed in one unit -- having -- equipment -- receiving -- attachment and detachment, while being constituted as an exchangeable ink jet cartridge the head for carrying out the regurgitation of yellow ink, Magenta ink, and the cyanogen ink is similarly formed in one unit -- having -- equipment -- receiving -- attachment and detachment -- it is constituted as an exchangeable ink jet cartridge. because, compared with the head for carrying out the regurgitation of other ink, the operating frequency of the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality first is alike and high. When all of these heads are prepared in the unit of one, the life of the head for carrying out the regurgitation of Bk ink or/and the improvement liquid in image quality in the condition with the still usable head for carrying out the regurgitation of yellow ink, Magenta ink, and the cyanogen ink comes, and it must stop therefore, having to exchange the head which carries out the regurgitation of all the ink. When it is made exchangeable for every head which carries out the regurgitation of each ink so that only the head to which the life came can be exchanged on the other hand, the wiring pad electrically connected to the equipment of a predetermined number for every head of this is needed, it will increase compared with the time of the number of wiring pads constituting each head in one, the area of the electric contact

section on carriage will also increase, and carriage will be enlarged. Moreover, since the number of wiring also increases, wiring resistance will increase, and power loss will also be produced. Since carriage will have a wearing device for every head, of course, this will also cause enlargement of carriage.

[0039] therefore, the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality at least like this example -- one unit -- forming -- equipment -- receiving -- attachment and detachment -- only a head part with high operating frequency can be made exchangeable, without enlarging magnitude of carriage so much by considering as an exchangeable ink jet cartridge. moreover, the head for carrying out the regurgitation of yellow ink, Magenta ink, and the cyanogen ink -- also being related -- these heads -- one unit -- forming -- equipment -- receiving -- attachment and detachment -- considering as an exchangeable ink jet cartridge is desirable. In addition, although yellow ink, Magenta ink, and cyanogen ink are mentioned as ink other than Bk and the improvement liquid in image quality in this example, even if this inventions are the case where it has the ink tank of four or more colors, and the case where it has a shade per each color, they are used suitably, without being restricted to this. And in such a case, it is not necessary to form the head for carrying out the regurgitation of all the colors other than Bk and the improvement liquid in image quality in one, and it can divide it into two or more cartridges suitably.

[0040] Moreover, you may be the gestalt it may be disengageable from a ** ink jet cartridge just in the ink tank section in such an ink jet cartridge, and every ink tank which holds each ink for every cartridge in this case even if it is the gestalt of one is independently disengageable.

[0041] (Example 2) Drawing 4 is the perspective view of the ink jet recording head for shade colors, and a shade color ink tank. These ink jet recording heads for shade colors and the shade color ink tank of each other are used exchanging for the head 13 for colors which coalesced in the color ink tank 12 in drawing 1 , respectively, and when reproducing the image of a higher-definition photograph tone, the approach of printing using the shade ink explained by this drawing 4 is used.

[0042] In drawing 4 , 41 is the regurgitation chip with which one top plate with which two or more nozzles and orifices for carrying out the regurgitation of the record drop were formed in two trains and the interior, two heater boards on which two or more heaters for generation of heat which are the energy generation section for carrying out the regurgitation of the record drop were formed, and two springs for immobilization which fix this heater board to a top plate were assembled in one.

[0043] 42 builds 6 color ink of yellow dark ink, yellow light ink, Magenta dark ink, Magenta light ink, cyanogen dark ink, and cyanogen light ink in the interior, and is a shade color ink tank to hold and which was formed in one. 43 is an ink tank holder with which the ink jet recording head for shade colors of each other is being fixed by **** or the heat caulking in one while the shade color ink tank 42 is detached and attached.

[0044] each color ink contains in the shade color ink tank 42 from the near side in drawing in order of C ink, M ink, and Y ink -- having -- **** -- further -- C, M, and Y -- a color reproduction field is expanded with each consisting of ink of two sorts of shades, and it becomes possible to reproduce the high definition of a photograph tone. Under the present circumstances, by the image of a photograph tone, since the color reproduction of the highlights section increases, when the amount of the light ink used increases compared with the amount of the dark ink used and builds in six sorts of ink of Y, M, and C each color shade in the same tank, it is necessary to build light ink in a large quantity more. Therefore, in drawing 4 , light ink is arranged to the right part in drawing, dark ink is arranged to a left part, and it is made a

configuration whose dark ink of each color 2-double-holds the light ink of each color.
[0045] Six sorts of ink [more than / equipping with the shade ink tank 42 in the ink tank holder 43] is open for free passage in the regurgitation chip 41, Y, M, and C dark ink are led to the liquid room where the back side in drawing in the regurgitation chip 41 was carried out 3 color separation, and Y, M, and C light ink are led to the liquid room where 3 color separation of near sides in drawing was carried out. 44 is the orifice train of the single tier in which Y, M, and the light ink of C each color carry out the regurgitation, 45 is the orifice train of the single tier in which Y, M, and the dark ink of C each color carry out the regurgitation, and each liquid is breathed out according to an individual according to recording information, and reaches the target on recorded media.
[0046] As mentioned above, by taking such a configuration, the improvement liquid in image quality is really [head tank] for Bk which was first explained by drawing 2 breathed out from a cartridge, and each color ink of Y, M, and C shade reaches the target on the same pixel on recorded media continuously.
[0047] In the above configurations, the positioning criteria within a recording device are established in the regurgitation chip 41. The positioning criteria 46 of the cross direction of the light ink orifice train 44 and the dark ink orifice train 45 are formed in the tank wearing direction anterior part of the location 41 where a recording head contacts a recording apparatus and the beginning inside the body of equipment, i.e., a regurgitation chip. Two or more orifice train will be fixed with a sufficient precision by the positioning criteria 46, the light ink orifice train 44, and the dark ink orifice train 45 being formed in both the regurgitation chips 41.
[0048] As mentioned above, when light ink and two sorts of dark ink are used for Y, M, and C each color, the six ink joint sections are opened for free passage and formed in the ink tank holder 43 from the regurgitation chip 41. From the regurgitation chip 41 being located in the tank wearing direction anterior part, the six ink joint sections will also be inevitably located in the wearing direction anterior part. Moreover, when the light ink of each color is the configuration that the dark ink of each color is 2-double-held, as mentioned above, An ink kind with little capacity to the anterior part of the ink tank wearing direction of the left of drawing By arranging an ink kind with much capacity at the posterior part of the ink tank wearing direction of the method of the right of drawing, and arranging the ink feed hopper of an ink kind with much capacity near the ink feed hopper of an ink kind with little capacity, on the whole, it is short and an ink supply system can be arranged efficiently.
[0049] Drawing 5 is the perspective view of the ink tank holder 43, and shows as an example the ink tank holder for shade color ink jet heads shown in drawing 4 by drawing 5 . Although the ink tank 42 of drawing 4 is detached and attached by the holder shown in drawing 5 , in drawing 5 , 51 is a rubber seal member which is the wrap joint section about the joint of an ink tank, and has the function to hold the airtight at the time of ink tank junction. 52 is each filter.
[0050] Each sheathing member of the ink tank 22 having the color ink tank 32 of drawing 3 of the above-mentioned example 1, the shade color ink tank 42 of drawing 4 of an example 2, Bk ink of drawing 2 , and the improvement liquid in image quality consists of Plastic solids of the low polypropylene of permeability, and can prevent evaporation of the ink by long-term neglect according to concomitant use with the above-mentioned rubber seal member.
[0051] (Example 3) In the still more above examples 1 and 2, although the important section of the object for the ink tanks 32 for colors of C, M, and Y3 color and the ink tank holder 43 for ink tank 42 for shade 6 color colors is usually substantially common on a design When a user incorrect-equips a predetermined ink tank holder with another ink tank and performs printing actuation, naturally a predetermined quality of printed character will not be obtained, or the

trouble [exhausting / of the early amount of ink] will be caused.
[0052] This example is what added the means in order to prevent automatically incorrect wearing of this kind of ink tank, and it shows said drawing 3 and drawing 4 , and a 5 about Fig. to drawing 6 and drawing 8 , and 9, respectively.
[0053] The description of this example establishes the following incorrect insertion prevention means, as shown in drawing 6 -9, respectively.
[0054] (1) Color ink tank 200A for 3 colors, and ink tank holder 100A (drawing 6 , 7)
1) Two projections 107 are formed in the back end of 3 color ink tank holder 100A (drawing 7), two slots 211 are established in the back end of ink tank 200A, and said projection 107 was made to escape (drawing 6).
[0055] 2) The hole 120 into which two heights 205 (drawing 6) of the point of ink tank 200A fit was established in the front end of ink tank holder 100A two places (drawing 7).
[0056] (2) Color ink tank 200B for shade 6 colors, and holder 100B of an ink tank (drawing 8 , 9)
1) Projection 106 is formed near the feed hopper inside [front] ink tank holder 100B (drawing 9), a notch 210 is formed in the front both sides of ink tank 200B, and said projection 106 was made to escape (drawing 8).
[0057] 2) Heights 205 were formed at three tips of ink tank 200B (drawing 8), and the hole 120 of the complementation containing said each heights 205 was established in the front end of tank holder 100B three places (drawing 9).
[0058] If it is going to insert (1) 3 color ink tank 200A in 6 color ink tank holder 100B by the above configurations, tank 200A cannot insert in contact with the projection 106 prepared in this holder 100B. Since the projection 106 prepared near the feed hopper at this time is formed more highly than a feed hopper, tank 200A can prevent contacting a feed hopper and damaging a feed hopper.
[0059] (2) Conversely, since there are only each two holes 120 of holder 100A while tank 200B cannot insert in contact with the back end projection 107 of holder 100A when it is going to insert in 3 color ink tank holder 100A, the central tip heights 205 cannot insert 6 color ink tank 200B in contact with holder 300A.
[0060] By the above configurations, mutual holder incorrect insertion of 3 colors / 6 **** tank can be prevented.
[0061] In addition, although the example which set to this example 3 and used specific heights, a specific hole configuration, etc. of the complementation for the each tank and holder order section as an incorrect insertion prevention means to the holder of each ink, respectively was explained, as for these means, it is needless to say that it does not interfere even if it is not limited only to this and uses the combination of other configurations of various kinds of.
[0062]
[Effect of the Invention] As explained above, according to this invention, it became possible by using the improvement liquid in image quality to raise image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, on the record medium of a wide range class. In addition, it became possible to acquire a uniform image property in each color at the time of each color formation by making a pixel in the paper usually breathe out the improvement liquid in image quality first, and the ink which contains a coloring component continuously being breathed out on the same pixel, i.e., the ink containing a coloring material reaching the target on the field where the improvement liquid in image quality was always imprinted.
[0063] moreover, the head for carrying out the regurgitation of Bk ink and the improvement

liquid in image quality at least -- one unit -- forming -- equipment -- receiving -- attachment and detachment -- only a head part with high operating frequency can be made exchangeable, without enlarging magnitude of carriage so much by considering as an exchangeable ink JIEKKATO ridge.
[0064] Furthermore, when reproducing the high definition of a photograph tone using shade ink, it became possible to really [shade] reduce the operation cost at the time of tank use by making the amount of light ink more abundant than the amount of dark ink. Moreover, the sheathing member of an ink tank became possible [preventing evaporation of the ink by long-term neglect] according to concomitant use with the rubber seal member of the joint section using the Plastic solid of the low polypropylene of permeability.
[0065] Moreover, since the possibility of each holder incorrect wearing of three colors and a shade 6 color ink tank is prevented beforehand, for example, the predetermined printing effectiveness is always acquired.

TECHNICAL FIELD

[Field of the Invention] Especially this invention relates to an ink jet recording apparatus and this ink tank for equipments about a recording apparatus.

PRIOR ART

[Description of the Prior Art] In the recording device according to the conventional ink jet recording method, the ink containing the color as a coloring component is held in an ink tank as recording ink, the ink in an ink tank is supplied to an ink jet recording head, and the image is formed by carrying out the regurgitation of the ink on recorded media.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to this invention, it became possible by using the improvement liquid in image quality to raise image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, on the record medium of a wide range class. In addition, it became possible to acquire a uniform image property in each color at the time of each color formation by making a pixel in the paper usually breathe out the improvement liquid in image quality first, and the ink which contains a coloring component continuously being breathed out on the same pixel, i.e., the ink containing a coloring material reaching the target on the field where the improvement liquid in image quality was always imprinted.
[0063] moreover, the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality at least -- one unit -- forming -- equipment -- receiving -- attachment and detachment -- only a head part with high operating frequency can be made exchangeable, without enlarging magnitude of carriage so much by considering as an exchangeable ink JIEKKATO ridge.
[0064] Furthermore, when reproducing the high definition of a photograph tone using shade ink,

it became possible to really [shade] reduce the operation cost at the time of tank use by making the amount of light ink more abundant than the amount of dark ink. Moreover, the sheathing member of an ink tank became possible [preventing evaporation of the ink by long-term neglect] according to concomitant use with the rubber seal member of the joint section using the Plastic solid of the low polypropylene of permeability.
[0065] Moreover, since the possibility of each holder incorrect wearing of three colors and a shade 6 color ink tank is prevented beforehand, for example, the predetermined printing effectiveness is always acquired.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, if it was in this kind of recording device, it was very difficult for many image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, to change according to the class of record medium, and to realize a formation image satisfied with the record medium of all classes. Furthermore, in order to realize high definition of a photograph tone, for example, magnitude of a record drop will be made small, it will be necessary to raise recording density, the fall of the record engine performance which originates in the nozzle at the time of ink jet recording head manufacture and the improvement in precision of the orifice section inevitably, and the manufacture yield will arise, and it will lead also to the fall of a recording rate further.
[0004] This invention was made in view of the above aspects of affairs, and it aims at offer of the means for realizing high definition while satisfying said many image properties by equipping a proper recording head with a proper ink tank.
[0005]

MEANS

[Means for Solving the Problem] For this reason, in this invention, it is going to attain said purpose by offering one ink jet record of each following item (1) - (16), and this ink tank for equipments.
[0006] (1) The ink jet recording head which breathes out a record drop to recorded media and forms an image, It has an ink tank holding two or more sorts of recording ink supplied to this ink jet recording head. One sort in said two or more sorts of recording ink They are the ink jet recording device which is the improvement liquid in image quality with the function which improves the image quality and image robustness which do not contain a coloring component, and this ink tank for equipments. The ink tank having said improvement liquid in image quality is arranged at the scanning direction edge of said ink jet recording head. The ink jet recording device with which said improvement liquid in image quality is first breathed out on the pixel on recorded media, and the ink which contains a coloring agent continuously is breathed out on the same pixel, and this ink tank for equipments.
[0007] (2) said -- image quality -- improvement -- liquid -- plurality -- a color -- a coloring agent -- containing -- ink -- inside -- at least -- one -- a sort -- one -- ink -- a tank -- inside -- holding -- having -- said -- an ink jet -- a recording head -- supplying -- having -- the above -- (-- one --) -- a publication -- an ink jet -- a recording device -- and -- this -- equipment -- ** -- ink -- a tank .

[0008] (3) The ink jet recording head which breathes out a record drop to recorded media and forms an image, In the same color as the ink of two or more colors which held the ink supplied to this ink jet recording head, and were held in the ink tank with a removable configuration, and said ink tank They are an ink jet recording device with the ink of two or more concentration in which an ink color differs from pigment concentration, and this ink tank for equipments. Each ink of said two or more colors and non-two or more concentration is built in in the ink tank of the same one apparatus. The amount of ink of light ink with low color or pigment concentration is the ink jet recording device currently held more in the ink tank at the large quantity compared with the amount of ink of the dark ink of the same color, and an ink tank for these equipments.
[0009] (4) said -- ink -- a tank -- inside -- building -- having -- ink -- ink -- a color -- yellow -- a Magenta -- cyanogen -- three -- colors -- it is -- at least -- a Magenta -- cyanogen -- a color -- being related -- a shade -- two -- a sort -- more than -- plurality -- concentration -- ink -- having -- the above -- (-- three --) -- a publication -- an ink jet -- a recording device -- and -- this -- equipment -- ** -- ink -- a tank .
[0010] (5) The ink jet recording head which breathes out a record drop on recorded media and forms an image, The ink tank which holds the ink supplied to this ink jet recording head, and has a removable configuration, Have the ink of two or more colors held in said ink tank, and ink of two or more concentration in which an ink color differs from pigment concentration in the same color. The ink capacity of each ink which is an ink jet recording device and this ink tank for equipments, and has two or more concentration differs, respectively. While an ink kind with little capacity is arranged at the anterior part of the ink tank wearing direction and the ink kind with much capacity is arranged at the posterior part of the ink tank wearing direction, the ink feed hopper of an ink kind with much said capacity The ink jet recording device arranged near the ink feed hopper of an ink kind with little said capacity, and this ink tank for equipments.
[0011] (6) The sheathing member of said ink tank is the above (1) which is the Plastic solid of polypropylene and has a rubber seal member in the ink jet recording head flank of the ink joint section with the ink jet recording head of this ink tank thru/or an ink jet recording device given in either of (5), and an ink tank for these equipments.
[0012] (7) In the ink jet recording device which uses each ink tank of an exchangeable different class alternatively the ink tank holder of said ink jet recording head -- receiving -- respectively -- attachment and detachment -- While being able to fit in at the complementation to said different kind of each ink tank, and wearing combination respectively predetermined to each applied part of the holder of each ink tank of business the above (1) equipped with the engagement means of fitting impossible to wearing combination other than predetermined [said] thru/or (6) -- an ink jet recording device given in either, and this ink tank for equipments.
[0013] (8) Said different kind of each ink tank is the ink jet recording device of the aforementioned (7) publication which are 3 color color ink tank and a shade 6 color color ink tank, and an ink tank for these equipments.
[0014] (9) the ink-jet recording head which carries out the regurgitation of the improvement liquid in image quality to the ink-jet recording head which carries out the regurgitation of the black recording ink in the ink-jet recording apparatus which has the ink-jet recording head of the color type which breathes out the improvement liquid in image quality which improves image quality and image robustness at reacting with this recording ink excluding the recording ink and the coloring component containing black of two or more colors to recorded media, and forms an image -- said equipment -- receiving -- attachment and detachment -- the ink-jet recording apparatus constituted by one as an exchangeable ink-jet cartridge.
[0015] (10) Liquid other than the black recording ink in said ink jet recording device and the

improvement liquid in image quality is an ink jet recording device given in the above (9) which is yellow ink, Magenta ink, and cyanogen ink.
[0016] (11) each ink jet recording head which carries out the regurgitation of said yellow ink, Magenta ink, and the cyanogen ink -- said equipment -- receiving -- attachment and detachment -- an ink jet recording device given in the above (10) constituted by one as an exchangeable ink jet cartridge.
[0017] (12) Said ink jet cartridge is an ink jet recording device the above (9) it has the ink tank for holding said recording ink, and this ink tank is more nearly removable than said ink jet cartridge thru/or given in either of (11).
[0018] (13) Said ink tank is an ink jet recording device given in the above (12) which it is divided for every recording ink and is removable.
[0019] (14) Breathe out the improvement liquid in image quality which improves image quality and image robustness at reacting with this recording ink excluding the recording ink and the coloring component containing black of two or more colors to recorded media. It is the ink jet cartridge with which it is equipped exchangeable to the ink jet recording apparatus of the color type which forms an image. This ink jet cartridge is an ink jet cartridge which has one for the ink tank holding the ink tank holding the ink jet recording head and black recording ink which carry out the regurgitation of the improvement liquid in image quality to the ink jet recording head which carries out the regurgitation of the black recording ink, and the improvement liquid in image quality.
[0020] (15) An ink jet recording device given in the above (14) said ink tank is more nearly removable than said ink jet cartridge.
[0021] (16) An ink jet cartridge given in the above (15) which is independently removable to an ink jet cartridge respectively.

OPERATION

[Function] While satisfying many image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, in the record medium of all classes by adopting the above this invention configurations, it also becomes possible further to realize high definition of for example, a photograph tone.
[0023] Moreover, it can insert without fear of incorrect wearing of a proper ink tank to a proper ink recording device certainly.
[0024]
[Embodiment of the Invention] Below, two or more examples explain the gestalt of operation of this invention at a detail based on a drawing.

EXAMPLE

[Example]
(Example 1) The ink jet recording head of one suitable example which starts this invention at drawing 1 , and the arrangement perspective view of an ink tank are shown. In drawing, 11 is really [head tank] in which the ink tank which contains two sorts of recording ink of the improvement liquid in image quality with the function which improves the image quality and

image robustness which do not contain black (Bk) ink and a coloring component, and holds an ink jet recording head and two sorts of recording ink inside was formed in one a cartridge.
[0026] The improvement liquid in image quality has the function which raises image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, on the record medium of a wide range class, the poly allylamine (it is hereafter described as "PAA") water solution is used as a principal component as an example, it is coalescing in the ink which dissolved the color on recorded media, PAA and a color adsorb, and it has the special feature that image robustness mainly improves.
[0027] 12 is a color ink tank which holds the (Yellow Y) (Magenta M) (cyanogen C) 3 color ink containing the color as a coloring component inside. 13 is the color ink tank 12 and the ink jet recording head for color picture formation formed removable. Furthermore, in drawing 1 , 14 is carriage with which it is equipped with the head for record, and 15 is the head recovery unit by which the suction pump for attracting ink was incorporated from two or more orifices at the time of the head cap which prevents the ink desiccation from two or more orifices which carry out the regurgitation of the ink formed in the head point, and the malfunction of a head. 16 is a feed side where a record form is conveyed.
[0028] It is above really [head tank] for Bk equipped with a cartridge 11 and the ink jet recording head 13 for colors which coalesced in the color ink tank 12 on carriage 14 at a horizontal single tier. As an example, the improvement liquid in image quality which really [head tank] for Bk has the function which improves the image quality and image robustness which do not contain a coloring component in a cartridge 11 is arranged the right-hand side in drawing by drawing 1 .
[0029] Carriage 14 makes the location on the recovery unit 15 the home position, and printing is started by beginning to scan leftward in drawing. Recorded media are a regular paper, and when printing using the improvement liquid in image quality with the function which improves image robustness etc., printing is performed only to a scan uni directional leftward at the time of the scan to the left. Therefore, Bk ink and the next which the improvement liquid in image quality with the function which improves image robustness etc. usually reaches the target in the paper first, then contain the color as a coloring material are usually reached in the paper in order of cyanogen, a Magenta, and yellow ink.
[0030] By thus, the improvement liquid in image quality usually being first breathed out by the pixel in the paper, and the ink which contains a coloring agent continuously being breathed out on the same pixel, i.e., the ink containing a coloring material reaching the target on the field where the improvement liquid in image quality was always imprinted, At the time of each color formation, a uniform image property can be acquired in each color, and image properties, such as color enhancement, record concentration, fixable, a water resisting property, and weatherability, can be raised to homogeneity in each color in the record-medium top of a wide range class.
[0031] Drawing 2 is really [head tank] for Bk the perspective view of a cartridge 11. In drawing 2 , 21 is the regurgitation chip with which the top plate of the piece by which two or more nozzles and orifices for carrying out the regurgitation of the record drop were formed in two trains and the interior, two heater boards on which two or more heaters for generation of heat which are the energy generation section for carrying out the regurgitation of the record drop were formed, and two springs for immobilization which fix each heater board to a top plate were assembled in one.
[0032] 22 builds in two sorts of recording ink of the improvement liquid in image quality which has in the interior the function which improves the image quality and image robustness which do not contain Bk ink and a coloring component, and is an ink tank to hold. The regurgitation chip

21 and the ink tank 22 of each other are fixed in one.
[0033] The near side in drawing in the ink tank 22 and Bk ink are arranged for the improvement liquid in image quality at tales doses at the ****** side, respectively. Two sorts of each ink is open for free passage in the regurgitation chip 21, and the near side in drawing in the regurgitation chip 21 and Bk ink are led to the liquid room by the side of ****** for the improvement liquid in image quality. 23 is an orifice train only for the improvement liquid in image quality, 24 is an orifice train only for Bk ink, and each liquid is breathed out according to an individual from the orifice train of two trains according to recording information, and reaches the target on recorded media. as mentioned above, the thing for which such a configuration is taken -- the beginning -- the improvement liquid in image quality -- Bk ink reaches the same pixel on recorded media continuously.
[0034] Drawing 3 is the perspective view of the ink jet recording head for colors, and a color ink tank. In drawing, 31 is the regurgitation chip with which one top plate with which two or more nozzles and orifices for carrying out the regurgitation of the record drop were formed in one train and the interior, one heater board on which two or more heaters for generation of heat which are the energy generation section for carrying out the regurgitation of the record drop were formed, and one spring for immobilization which fixes this heater board to a top plate were assembled in one.
[0035] 32 builds 3 color ink of Y, M, and C in the interior, and is a color ink tank to hold and which was formed in one. 33 is an ink tank holder with which the ink jet recording head for colors of each other is being fixed by **** or the heat caulking in one while the color ink tank 32 is detached and attached.
[0036] In order of C ink, M ink, and Y ink, each color ink is built in tales doses in the color ink tank 32 from the near side in drawing, and by equipping with the color ink tank 32 in the ink tank holder 33, three sorts of ink is open for free passage in the regurgitation chip 31, and is led to the liquid room where the back side in drawing in the regurgitation chip 31 was carried out 3 color separation.
[0037] 34 is the orifice train of the single tier in which Y, M, and C each color ink carry out the regurgitation, and each liquid is breathed out according to an individual according to recording information, and reaches the target on recorded media. As mentioned above, by taking such a configuration, the improvement liquid in image quality is really [head tank] for Bk which was first explained by drawing 2 breathed out from a cartridge, and Y, M, and C each color ink reach the target on the same pixel on recorded media continuously.
[0038] As previously explained in this example, it is five kinds of ink (although it has composition which carries out the regurgitation of the liquid), Bk ink, the improvement liquid in image quality, yellow ink, Magenta ink, and cyanogen ink. here, the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality is formed in one unit -- having -- equipment -- receiving -- attachment and detachment, while being constituted as an exchangeable ink jet cartridge the head for carrying out the regurgitation of yellow ink, Magenta ink, and the cyanogen ink is similarly formed in one unit -- having -- equipment -- receiving -- attachment and detachment -- it is constituted as an exchangeable ink jet cartridge. because, compared with the head for carrying out the regurgitation of other ink, the operating frequency of the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality first is alike and high. When all of these heads are prepared in the unit of one, the life of the head for carrying out the regurgitation of Bk ink or/and the improvement liquid in image quality in the condition with the still usable head for carrying out the regurgitation of yellow ink, Magenta ink, and the cyanogen ink comes, and it must stop therefore, having to exchange the head which

carries out the regurgitation of all the ink. When it is made exchangeable for every head which carries out the regurgitation of each ink so that only the head to which the life came can be exchanged on the other hand, the wiring pad electrically connected to the equipment of a predetermined number for every head of this is needed, it will increase compared with the time of the number of wiring pads constituting each head in one, the area of the electric contact section on carriage will also increase, and carriage will be enlarged. Moreover, since the number of wiring also increases, wiring resistance will increase, and power loss will also be produced. Since carriage will have a wearing device for every head, of course, this will also cause enlargement of carriage.

[0039] therefore, the head for carrying out the regurgitation of Bk ink and the improvement liquid in image quality at least like this example -- one unit -- forming -- equipment -- receiving -- attachment and detachment -- only a head part with high operating frequency can be made exchangeable, without enlarging magnitude of carriage so much by considering as an exchangeable ink jet cartridge. moreover, the head for carrying out the regurgitation of yellow ink, Magenta ink, and the cyanogen ink -- also being related -- these heads -- one unit -- forming -- equipment -- receiving -- attachment and detachment -- considering as an exchangeable ink jet cartridge is desirable. In addition, although yellow ink, Magenta ink, and cyanogen ink are mentioned as ink other than Bk and the improvement liquid in image quality in this example, even if this inventions are the case where it has the ink tank of four or more colors, and the case where it has a shade per each color, they are used suitably, without being restricted to this. And in such a case, it is not necessary to form the head for carrying out the regurgitation of all the colors other than Bk and the improvement liquid in image quality in one, and it can divide it into two or more cartridges suitably.

[0040] Moreover, you may be the gestalt it may be disengageable from a ** ink jet cartridge just in the ink tank section in such an ink jet cartridge, and every ink tank which holds each ink for every cartridge in this case even if it is the gestalt of one is independently disengageable.

[0041] (Example 2) Drawing 4 is the perspective view of the ink jet recording head for shade colors, and a shade color ink tank. These ink jet recording heads for shade colors and the shade color ink tank of each other are used exchanging for the head 13 for colors which coalesced in the color ink tank 12 in drawing 1 , respectively, and when reproducing the image of a higher-definition photograph tone, the approach of printing using the shade ink explained by this drawing 4 is used.

[0042] In drawing 4 , 41 is the regurgitation chip with which one top plate with which two or more nozzles and orifices for carrying out the regurgitation of the record drop were formed in two trains and the interior, two heater boards on which two or more heaters for generation of heat which are the energy generation section for carrying out the regurgitation of the record drop were formed, and two springs for immobilization which fix this heater board to a top plate were assembled in one.

[0043] 42 builds 6 color ink of yellow dark ink, yellow light ink, Magenta dark ink, Magenta light ink, cyanogen dark ink, and cyanogen light ink in the interior, and is a shade color ink tank to hold and which was formed in one. 43 is an ink tank holder with which the ink jet recording head for shade colors of each other is being fixed by **** or the heat caulking in one while the shade color ink tank 42 is detached and attached.

[0044] each color ink contains in the shade color ink tank 42 from the near side in drawing in order of C ink, M ink, and Y ink -- having -- **** -- further -- C, M, and Y -- a color reproduction field is expanded with each consisting of ink of two sorts of shades, and it becomes possible to reproduce the high definition of a photograph tone. Under the present circumstances,

by the image of a photograph tone, since the color reproduction of the highlights section increases, when the amount of the light ink used increases compared with the amount of the dark ink used and builds in six sorts of ink of Y, M, and C each color shade in the same tank, it is necessary to build light ink in a large quantity more. Therefore, in drawing 4 , light ink is arranged to the right part in drawing, dark ink is arranged to a left part, and it is made a configuration whose dark ink of each color 2-double-holds the light ink of each color.
[0045] Six sorts of ink [more than / equipping with the shade ink tank 42 in the ink tank holder 43] is open for free passage in the regurgitation chip 41, Y, M, and C dark ink are led to the liquid room where the back side in drawing in the regurgitation chip 41 was carried out 3 color separation, and Y, M, and C light ink are led to the liquid room where 3 color separation of near sides in drawing was carried out. 44 is the orifice train of the single tier in which Y, M, and the light ink of C each color carry out the regurgitation, 45 is the orifice train of the single tier in which Y, M, and the dark ink of C each color carry out the regurgitation, and each liquid is breathed out according to an individual according to recording information, and reaches the target on recorded media.
[0046] As mentioned above, by taking such a configuration, the improvement liquid in image quality is really [head tank] for Bk which was first explained by drawing 2 breathed out from a cartridge, and each color ink of Y, M, and C shade reaches the target on the same pixel on recorded media continuously.
[0047] In the above configurations, the positioning criteria within a recording device are established in the regurgitation chip 41. The positioning criteria 46 of the cross direction of the light ink orifice train 44 and the dark ink orifice train 45 are formed in the tank wearing direction anterior part of the location 41 where a recording head contacts a recording apparatus and the beginning inside the body of equipment, i.e., a regurgitation chip. Two or more orifice train will be fixed with a sufficient precision by the positioning criteria 46, the light ink orifice train 44, and the dark ink orifice train 45 being formed in both the regurgitation chips 41.
[0048] As mentioned above, when light ink and two sorts of dark ink are used for Y, M, and C each color, the six ink joint sections are opened for free passage and formed in the ink tank holder 43 from the regurgitation chip 41. From the regurgitation chip 41 being located in the tank wearing direction anterior part, the six ink joint sections will also be inevitably located in the wearing direction anterior part. Moreover, when the light ink of each color is the configuration that the dark ink of each color is 2-double-held, as mentioned above, An ink kind with little capacity to the anterior part of the ink tank wearing direction of the left of drawing By arranging an ink kind with much capacity at the posterior part of the ink tank wearing direction of the method of the right of drawing, and arranging the ink feed hopper of an ink kind with much capacity near the ink feed hopper of an ink kind with little capacity, on the whole, it is short and an ink supply system can be arranged efficiently.
[0049] Drawing 5 is the perspective view of the ink tank holder 43, and shows as an example the ink tank holder for shade color ink jet heads shown in drawing 4 by drawing 5 . Although the ink tank 42 of drawing 4 is detached and attached by the holder shown in drawing 5 , in drawing 5 , 51 is a rubber seal member which is the wrap joint section about the joint of an ink tank, and has the function to hold the airtight at the time of ink tank junction. 52 is each filter.
[0050] Each sheathing member of the ink tank 22 having the color ink tank 32 of drawing 3 of the above-mentioned example 1, the shade color ink tank 42 of drawing 4 of an example 2, Bk ink of drawing 2 , and the improvement liquid in image quality consists of Plastic solids of the low polypropylene of permeability, and can prevent evaporation of the ink by long-term neglect according to concomitant use with the above-mentioned rubber seal member.

[0051] (Example 3) In the still more above examples 1 and 2, although the important section of the object for the ink tanks 32 for colors of C, M, and Y3 color and the ink tank holder 43 for ink tank 42 for shade 6 color colors is usually substantially common on a design When a user incorrect-equips a predetermined ink tank holder with another ink tank and performs printing actuation, naturally a predetermined quality of printed character will not be obtained, or the trouble [exhausting / of the early amount of ink] will be caused.
[0052] This example is what added the means in order to prevent automatically incorrect wearing of this kind of ink tank, and it shows said drawing 3 and drawing 4 , and a 5 about Fig. to drawing 6 and drawing 8 , and 9, respectively.
[0053] The description of this example establishes the following incorrect insertion prevention means, as shown in drawing 6 -9, respectively.
[0054] (1) Color ink tank 200A for 3 colors, and ink tank holder 100A (drawing 6 , 7)
1) Two projections 107 are formed in the back end of 3 color ink tank holder 100A (drawing 7), two slots 211 are established in the back end of ink tank 200A, and said projection 107 was made to escape (drawing 6).
[0055] 2) The hole 120 into which two heights 205 (drawing 6) of the point of ink tank 200A fit was established in the front end of ink tank holder 100A two places (drawing 7).
[0056] (2) Color ink tank 200B for shade 6 colors, and holder 100B of an ink tank (drawing 8 , 9)
1) Projection 106 is formed near the feed hopper inside [front] ink tank holder 100B (drawing 9), a notch 210 is formed in the front both sides of ink tank 200B, and said projection 106 was made to escape (drawing 8).
[0057] 2) Heights 205 were formed at three tips of ink tank 200B (drawing 8), and the hole 120 of the complementation containing said each heights 205 was established in the front end of tank holder 100B three places (drawing 9).
[0058] If it is going to insert (1) 3 color ink tank 200A in 6 color ink tank holder 100B by the above configurations, tank 200A cannot insert in contact with the projection 106 prepared in this holder 100B. Since the projection 106 prepared near the feed hopper at this time is formed more highly than a feed hopper, tank 200A can prevent contacting a feed hopper and damaging a feed hopper.
[0059] (2) Conversely, since there are only each two holes 120 of holder 100A while tank 200B cannot insert in contact with the back end projection 107 of holder 100A when it is going to insert in 3 color ink tank holder 100A, the central tip heights 205 cannot insert 6 color ink tank 200B in contact with holder 300A.
[0060] By the above configurations, mutual holder incorrect insertion of 3 colors / 6 **** tank can be prevented.
[0061] In addition, although the example which set to this example 3 and used specific heights, a specific hole configuration, etc. of the complementation for the each tank and holder order section as an incorrect insertion prevention means to the holder of each ink, respectively was explained, as for these means, it is needless to say that it does not interfere even if it is not limited only to this and uses the combination of other configurations of various kinds of.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The ink jet recording head of one example, and the arrangement perspective view of

an ink tank
[Drawing 2] It is really [head tank] for Bk the perspective view of a cartridge.
[Drawing 3] The perspective view of the ink jet recording head for colors of an example 1, and a color ink tank
[Drawing 4] The perspective view of the ink jet recording head for shade colors, and a shade color ink tank
[Drawing 5] The perspective view of the ink tank holder of an example 2
[Drawing 6] The drawing 3 equivalent Fig. of an example 3
[Drawing 7] The perspective view of the ink tank holder of an example 3
[Drawing 8] The drawing 4 equivalent Fig. of an example 3
[Drawing 9] The drawing 5 equivalent Fig. of an example 3
[Description of Notations]
11 It is Really [Head Tank] for Bk Cartridge.
12 Color Ink Tank
13 Ink Jet Recording Head for Colors
14 Carriage
15 Head Recovery Unit
16 Feed Side Where Record Form is Conveyed
21 Regurgitation Chip
22 Ink Tank
23 Orifice Train Only for Improvement Liquid in Image Quality
24 Orifice Train Only for Bk Ink
31 Regurgitation Chip
32 Color Ink Tank
33 Ink Tank Holder
34 Y, M, Orifice Train of Single Tier in which C Each Color Ink Carries Out Regurgitation
41 Regurgitation Chip
42 Shade Color Ink Tank
43 Dark Ink Tank Holder
44 Y, M, Orifice Train of Single Tier in which Light Ink of C Each Color Carries Out Regurgitation
45 Y, M, Orifice Train of Single Tier in which Dark Ink of C Each Color Carries Out Regurgitation
51 Rubber Seal Member
52 Filter
100A 3 color ink tank holder
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106 Projection
107 Back End Projection
120 Hole
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205 Tip Heights
210 Notching
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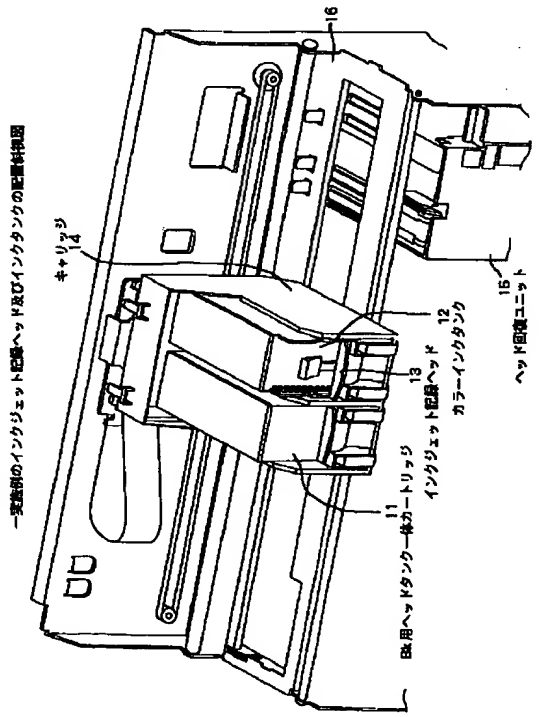
(54)【発明の名称】　インクジェット記録装置，この装置用インクタンク及びインクジェット記録装置に対して交換可能に装着されるインクジェットカートリッジ

(57)【要約】

【課題】　インクジェット記録装置において、記録媒体の種類に応じて、発色性、記録濃度、定着性、耐水性、耐候性などの画像諸特性が変化しても、これを満足させることができ、写真調等の高画質を実現し得る手段を提供する。

【解決手段】　このため、画質向上液を用いて、普通紙の画素に最初に吐出させ、続いて、着色剤を含むインクを同一画素上に吐出するよう構成した。



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【特許請求の範囲】

【請求項１】　記録液滴を被記録媒体に吐出して画像を形成するインクジェット記録ヘッドと、このインクジェット記録ヘッドに供給する複数種の記録液を保持するインクタンクとを持ち、前記複数種の記録液の中の１種は、着色成分を含まない画質及び画像堅牢性を向上する機能を持つ画質向上液であるインクジェット記録装置及びこの装置用インクタンクであって、

前記画質向上液を内蔵するインクタンクは、前記インクジェット記録ヘッドの走査方向端部に配置されており、被記録媒体上の画素上に前記画質向上液が最初に吐出され、続いて着色剤を含むインクが同一画素上に吐出されることを特徴とするインクジェット記録装置及びこの装置用インクタンク。

【請求項２】　前記画質向上液は、複数色の着色剤を含むインクの中の少なくとも１種と一体のインクタンク内に保持され、前記インクジェット記録ヘッドに供給されることを特徴とする請求項１記載のインクジェット記録装置及びこの装置用インクタンク。

【請求項３】　記録液滴を被記録媒体に吐出して画像を形成するインクジェット記録ヘッドと、このインクジェット記録ヘッドに供給するインクを保持し、着脱可能な構成を持つインクタンクと、前記インクタンク内に保持された複数色のインクと同一色で、インク染料もしくは顔料濃度が異なる複数濃度のインクとを持つインクジェット記録装置及びこの装置用インクタンクであって、

前記複数色、非複数濃度の各インクは同一の一体型のインクタンク内に内蔵されており、染料もしくは顔料濃度の低い淡インクのインク量は同一色の濃インクのインク量に比べより多量にインクタンク内に保持されていることを特徴とするインクジェット記録装置及びこの装置用インクタンク。

【請求項４】　前記インクタンク内に内蔵されるインクのインク色はイエロー，マゼンタ，シアンの３色であり、少なくともマゼンタ，シアン色に関しては濃淡２種以上の複数濃度のインクを持つことを特徴とする請求項３記載のインクジェット記録装置及びこの装置用インクタンク。

【請求項５】　記録液滴を被記録媒体上に吐出して画像を形成するインクジェット記録ヘッドと、このインクジェット記録ヘッドに供給するインクを保持し、着脱可能な構成を持つインクタンクと、前記インクタンク内に保持された複数色のインクと、同一色でインク染料もしくは顔料濃度が異なる複数濃度のインクとを持つ、インクジェット記録装置及びこの装置用インクタンクであって、

複数濃度を持つ各インクのインク容量がそれぞれ異なり、容量の少ないインク種がインクタンク装着方向の前部に、容量の多いインク種がインクタンク装着方向の後部に配置されていると共に、前記容量の多いインク種のインク供給口は、前記容量の少ないインク種のインク供給口近傍に配置されていることを特徴とするインクジェット記録装置及びこの装置用インクタンク。

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【請求項６】　前記インクタンクの外装部材は、ポリプロピレンの成形体であり、このインクタンクのインクジェット記録ヘッドとのインクジョイント部のインクジェット記録ヘッド側部には、ゴムシール部材を有することを特徴とする請求項１ないし５のいずれかに記載のインクジェット記録装置及びこの装置用インクタンク。

【請求項７】　前記インクジェット記録ヘッドのインクタンクホルダに対してそれぞれ着脱交換可能な異なる種類の各インクタンクを選択的に使用するインクジェット記録装置において、

前記異なる種類の各インクタンク及びそれぞれ用の各インクタンクのホルダの各装着部に、それぞれ所定の装着組合せに対しては相補に嵌合し得ると共に、前記所定以外の装着組合せに対しては、嵌合不能の係合手段を備えたことを特徴とする請求項１ないし６のいずれか記載のインクジェット記録装置及びこの装置用インクタンク。

【請求項８】　前記異なる種類の各インクタンクは３色カラーインクタンク及び濃淡６色カラーインクタンクであることを特徴とする請求項７記載のインクジェット記録装置及びこの装置用インクタンク。

【請求項９】　黒を含む複数色の記録液と着色成分を含まず該記録液と反応することで画質及び画像堅牢性を向上する画質向上液とを被記録媒体に吐出して画像を形成するカラータイプのインクジェット記録ヘッドを有するインクジェット記録装置において、

黒色記録液を吐出するインクジェット記録ヘッドと画質向上液を吐出するインクジェット記録ヘッドとが前記装置に対して着脱交換可能なインクジェットカートリッジとして一体に構成されていることを特徴とするインクジェット記録装置。

【請求項１０】　前記インクジェット記録装置における黒色記録液及び画質向上液以外の液はイエローインク、マゼンタインク、シアンインクであることを特徴とする請求項９に記載のインクジェット記録装置。

【請求項１１】　前記イエローインク、マゼンタインク、シアンインクを吐出するそれぞれのインクジェット記録ヘッドが前記装置に対して着脱交換可能なインクジェットカートリッジとして一体に構成されていることを特徴とする請求項１０に記載のインクジェット記録装置。

【請求項１２】　前記インクジェットカートリッジは前記記録液を保持するためのインクタンクを有しており、該インクタンクが前記インクジェットカートリッジより着脱可能となっている請求項９ないし１１のいずれか１項に記載のインクジェット記録装置。

【請求項１３】　前記インクタンクは各記録液毎に分割されており、それぞれが着脱可能となっている請求項１

２に記載のインクジェット記録装置。

【請求項１４】　黒を含む複数色の記録液と着色成分を含まず該記録液と反応することで画質及び画像堅牢性を向上する画質向上液とを被記録媒体に吐出して画像を形成するカラータイプのインクジェット記録装置に対して交換可能に装着されるインクジェットカートリッジであって、

該インクジェットカートリッジは黒色記録液を吐出するインクジェット記録ヘッドと画質向上液を吐出するインクジェット記録ヘッド及び黒色記録液を保持するインクタンクと画質向上液とを保持するインクタンクを一体に有することを特徴とするインクジェットカートリッジ。

【請求項１５】　前記インクタンクが前記インクジェットカートリッジより着脱可能となっている請求項１４に記載のインクジェット記録装置。

【請求項１６】　前記黒色記録液を保持するインクタンクと画質向上液とを保持するインクタンクとがそれぞれ独立にインクジェットカートリッジに対して着脱可能となっている請求項１５に記載のインクジェットカートリッジ。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は記録装置に関し、特に、インクジェット記録装置及びこの装置用インクタンクに関するものである。

【０００２】

【従来の技術】従来のインクジェット記録方式に従う記録装置においては、記録液として、着色成分としての染料を含むインクをインクタンク内に保持し、インクタンク内インクをインクジェット記録ヘッドに供給し、被記録媒体上にインクを吐出することにより画像を形成している。

【０００３】

【発明が解決しようとする課題】しかしながら、この種の記録装置にあっては、記録媒体の種類に応じて発色性、記録濃度、定着性、耐水性、耐候性などの画像諸特性が変化し、すべての種類の記録媒体に満足な形成画像を実現することは極めて困難であった。さらに、例えば写真調の高画質を実現するためには、記録液滴の大きさを小さくし、記録密度を高めることが必要となり、必然的にインクジェット記録ヘッド製造時のノズル、オリフィス部の精度向上に起因する記録性能、製造歩留まりの低下が生じ、さらに記録速度の低下にもつながることになる。

【０００４】本発明は、以上のような局面にかんがみてなされたもので、適正なインクタンクを適正な記録ヘッドに装着することにより、前記画像諸特性を満足させると共に、高画質を実現するための手段の提供を目的としている。

【０００５】

【課題を解決するための手段】このため本発明においては、つぎの各項（１）～（１６）のいずれかのインクジェット記録及びこの装置用インクタンクを提供することにより、前記目的を達成しようとするものである。

【０００６】（１）記録液滴を被記録媒体に吐出して画像を形成するインクジェット記録ヘッドと、このインクジェット記録ヘッドに供給する複数種の記録液を保持するインクタンクとを持ち、前記複数種の記録液の中の１種は、着色成分を含まない画質及び画像堅牢性を向上する機能を持つ画質向上液であるインクジェット記録装置及びこの装置用インクタンクであって、前記画質向上液を内蔵するインクタンクは、前記インクジェット記録ヘッドの走査方向端部に配置されており、被記録媒体上の画素上に前記画質向上液が最初に吐出され、続いて着色剤を含むインクが同一画素上に吐出されるインクジェット記録装置及びこの装置用インクタンク。

【０００７】（２）前記画質向上液は、複数色の着色剤を含むインクの中の少なくとも１種と一体のインクタンク内に保持され、前記インクジェット記録ヘッドに供給される前記（１）記載のインクジェット記録装置及びこの装置用インクタンク。

【０００８】（３）記録液滴を被記録媒体に吐出して画像を形成するインクジェット記録ヘッドと、このインクジェット記録ヘッドに供給するインクを保持し、着脱可能な構成を持つインクタンクと、前記インクタンク内に保持された複数色のインクと同一色で、インク染料もしくは顔料濃度が異なる複数濃度のインクとを持つインクジェット記録装置及びこの装置用インクタンクであって、前記複数色、非複数濃度の各インクは同一の一体型のインクタンク内に内蔵されており、染料もしくは顔料濃度の低い淡インクのインク量は同一色の濃インクのインク量に比べより多量にインクタンク内に保持されているインクジェット記録装置及びこの装置用インクタンク。

【０００９】（４）前記インクタンク内に内蔵されるインクのインク色はイエロー，マゼンタ，シアンの３色であり、少なくともマゼンタ，シアン色に関しては濃淡２種以上の複数濃度のインクを持つ前記（３）記載のインクジェット記録装置及びこの装置用インクタンク。

【００１０】（５）記録液滴を被記録媒体上に吐出して画像を形成するインクジェット記録ヘッドと、このインクジェット記録ヘッドに供給するインクを保持し、着脱可能な構成を持つインクタンクと、前記インクタンク内に保持された複数色のインクと、同一色でインク染料もしくは顔料濃度が異なる複数濃度のインクとを持つ、インクジェット記録装置及びこの装置用インクタンクであって、複数濃度を持つ各インクのインク容量がそれぞれ異なり、容量の少ないインク種がインクタンク装着方向の前部に、容量の多いインク種がインクタンク装着方向の後部に配置されていると共に、前記容量の多いインク

種のインク供給口は、前記容量の少ないインク種のインク供給口近傍に配置されているインクジェット記録装置及びこの装置用インクタンク。

【００１１】（６）前記インクタンクの外装部材は、ポリプロピレンの成形体であり、このインクタンクのインクジェット記録ヘッドとのインクジョイント部のインクジェット記録ヘッド側部には、ゴムシール部材を有する前記（１）ないし（５）のいずれかに記載のインクジェット記録装置及びこの装置用インクタンク。

【００１２】（７）前記インクジェット記録ヘッドのインクタンクホルダに対してそれぞれ着脱交換可能な異なる種類の各インクタンクを選択的に使用するインクジェット記録装置において、前記異なる種類の各インクタンク及びそれぞれ用の各インクタンクのホルダの各装着部に、それぞれ所定の装着組合せに対しては相補に嵌合し得ると共に、前記所定以外の装着組合せに対しては、嵌合不能の係合手段を備えた前記（１）ないし（６）いずれかに記載のインクジェット記録装置及びこの装置用インクタンク。

【００１３】（８）前記異なる種類の各インクタンクは３色カラーインクタンク及び濃淡６色カラーインクタンクである前記（７）記載のインクジェット記録装置及びこの装置用インクタンク。

【００１４】（９）黒を含む複数色の記録液と着色成分を含まず該記録液と反応することで画質及び画像堅牢性を向上する画質向上液とを被記録媒体に吐出して画像を形成するカラータイプのインクジェット記録ヘッドを有するインクジェット記録装置において、黒色記録液を吐出するインクジェット記録ヘッドと画質向上液を吐出するインクジェット記録ヘッドとが前記装置に対して着脱交換可能なインクジェットカートリッジとして一体に構成されているインクジェット記録装置。

【００１５】（１０）前記インクジェット記録装置における黒色記録液及び画質向上液以外の液はイエローインク、マゼンタインク、シアンインクである前記（９）に記載のインクジェット記録装置。

【００１６】（１１）前記イエローインク、マゼンタインク、シアンインクを吐出するそれぞれのインクジェット記録ヘッドが前記装置に対して着脱交換可能なインクジェットカートリッジとして一体に構成されている前記（１０）に記載のインクジェット記録装置。

【００１７】（１２）前記インクジェットカートリッジは前記記録液を保持するためのインクタンクを有しており、該インクタンクが前記インクジェットカートリッジより着脱可能となっている前記（９）ないし（１１）のいずれかに記載のインクジェット記録装置。

【００１８】（１３）前記インクタンクは各記録液毎に分割されており、それぞれが着脱可能となっている前記（１２）に記載のインクジェット記録装置。

【００１９】（１４）黒を含む複数色の記録液と着色成分を含まず該記録液と反応することで画質及び画像堅牢性を向上する画質向上液とを被記録媒体に吐出して画像を形成するカラータイプのインクジェット記録装置に対して交換可能に装着されるインクジェットカートリッジであって、該インクジェットカートリッジは黒色記録液を吐出するインクジェット記録ヘッドと画質向上液を吐出するインクジェット記録ヘッド及び黒色記録液を保持するインクタンクと画質向上液とを保持するインクタンクを一体を有するインクジェットカートリッジ。

【００２０】（１５）前記インクタンクが前記インクジェットカートリッジより着脱可能となっている前記（１４）に記載のインクジェット記録装置。

【００２１】（１６）前記黒色記録液を保持するインクタンクと画質向上液とを保持するインクタンクとがそれぞれ独立にインクジェットカートリッジに対して着脱可能となっている前記（１５）に記載のインクジェットカートリッジ。

【００２２】

【作用】以上のような本発明構成を採用することにより、すべての種類の記録媒体において発色性、記録濃度、定着性、耐水性、耐候性などの画像諸特性を満足させると共に、さらに、例えば写真調の高画質を実現することも可能となる。

【００２３】また、適正のインクタンクを適正のインク記録装置に誤装着の怖れなしに確実に挿入することができる。

【００２４】

【発明の実施の形態】以下に、本発明の実施の形態を、複数の実施例により図面に基づいて詳細に説明する。

【００２５】

【実施例】

（実施例１）図１に、本発明に係る好適な一実施例のインクジェット記録ヘッド及びインクタンクの配置斜視図を示す。図において、１１は黒（Ｂｋ）インク、及び着色成分を含まない画質及び画像堅牢性を向上する機能を持つ画質向上液の２種の記録液を内蔵しインクジェット記録ヘッド及び２種の記録液を内部に保持するインクタンクが一体的に形成されたヘッドタンク一体カートリッジである。

【００２６】画質向上液は、広範囲の種類の記録媒体上において発色性、記録濃度、定着性、耐水性、耐候性などの画像特性を向上させる機能を持ち、一例としてポリアリルアミン（以下、“ＰＡＡ”と記す）水溶液を主成分とし、被記録媒体上で染料を溶解したインクと合体することで、ＰＡＡと染料とが吸着し、主に画像堅牢性が向上するという特色を有している。

【００２７】１２は、着色成分としての染料を含むイエロー（Ｙ），マゼンタ（Ｍ），シアン（Ｃ）３色インクを内部に保持するカラーインクタンクである。１３は、カラーインクタンク１２と着脱可能に形成されたカラー

画像形成用のインクジェット記録ヘッドである。さらに、図１において１４は、記録用ヘッドが装着されるキャリッジであり、１５は、ヘッド先端部に形成されたインクを吐出する複数のオリフィスからのインク乾燥を防止するヘッドキャップと、ヘッドの動作不良時に複数のオリフィスからインクを吸引するための吸引ポンプとが組み込まれたヘッド回復ユニットである。１６は記録用紙が搬送される給紙面である。

【００２８】以上のＢｋ用ヘッドタンク一体カートリッジ１１と、カラーインクタンク１２と合体したカラー用インクジェット記録ヘッド１３とは、キャリッジ１４上に横一列に装着される。一例として、図１では、Ｂｋ用ヘッドタンク一体カートリッジ１１内に、着色成分を含まない画質及び画像堅牢性を向上する機能を持つ画質向上液が図中の右側に配置されている。

【００２９】キャリッジ１４は、回復ユニット１５上での位置をホームポジションとしており、印刷は図中の左方向へ走査し始めることで開始される。被記録媒体が普通紙であり、画像堅牢性等を向上する機能を持つ画質向上液を使用し印刷する場合には、左方向への走査時の、左方向へ走査片方向のみに印刷が行われる。従って、画像堅牢性等を向上する機能を持つ画質向上液が最初に普通紙上に着弾し、続いて、色剤としての染料を含むＢｋインク、つぎにシアン，マゼンタ，イエローインクの順番で普通紙上に着弾する。

【００３０】このように、画質向上液が普通紙上の画素に最初に吐出され、続けて着色剤を含むインクが同一画素上に吐出されること、すなわち常に画質向上液が転写された面上に色剤を含むインクが着弾することで、各色形成時に、各色において一様な画像特性を得ることができ、広範囲の種類の記録媒体上において発色性、記録濃度、定着性、耐水性、耐候性などの画像特性を各色において均一に向上させることができる。

【００３１】図２はＢｋ用ヘッドタンク一体カートリッジ１１の斜視図である。図２において、２１は、記録液滴を吐出するための複数のノズル及びオリフィスが２列、内部に形成された一個の天板と、記録液滴を吐出するためのエネルギー発生部である複数の発熱用ヒータが形成された２個のヒータボードと、それぞれのヒータボードを天板に固定する２個の固定用ばねとが一体的に組み立てられた吐出チップである。

【００３２】２２は、内部にＢｋインク、及び着色成分を含まない画質及び画像堅牢性を向上する機能を持つ画質向上液の２種の記録液を内蔵し、保持するインクタンクである。吐出チップ２１とインクタンク２２とは、互いに一体的に固定される。

【００３３】画質向上液は、インクタンク２２内の図中の手前側、Ｂｋインクは、図中奥側に、それぞれ同量に配置されている。それぞれの２種のインクは吐出チップ２１内に連通し、画質向上液は吐出チップ２１内の図中の手前側、Ｂｋインクは図中奥側の液室に導かれている。２３は、画質向上液専用のオリフィス列、２４は、Ｂｋインク専用のオリフィス列であり、それぞれの液体は記録情報に応じて２列のオリフィス列から個別に吐出され、被記録媒体上に着弾する。前述のように、このような構成をとることによって、最初に画質向上液、続けてＢｋインクが被記録媒体上の同一画素に着弾する。

【００３４】図３は、カラー用インクジェット記録ヘッドとカラーインクタンクの斜視図である。図において、３１は、記録液滴を吐出するための複数のノズル及びオリフィスが１列、内部に形成された１個の天板と、記録液滴を吐出するためのエネルギー発生部である複数の発熱用ヒータが形成された１個のヒータボードと、このヒータボードを天板に固定する１個の固定用ばねとが一体的に組み立てられた吐出チップである。

【００３５】３２は、内部にＹ，Ｍ，Ｃの３色インクを内蔵し、保持する一体的に形成されたカラーインクタンクである。３３は、カラーインクタンク３２が着脱されると共に、カラー用インクジェット記録ヘッドがねじまたは熱かしめにより互いに一体的に固定されているインクタンクホルダである。

【００３６】Ｃインク，Ｍインク，Ｙインクの順に、図中の手前側からカラーインクタンク３２内に各色インクが同量に内蔵されており、カラーインクタンク３２をインクタンクホルダ３３内に装着することで、３種のインクは吐出チップ３１内に連通し、吐出チップ３１内の図中の奥側の３色分離された液室に導かれる。

【００３７】３４は、Ｙ，Ｍ，Ｃ各色インクが吐出する一列のオリフィス列であり、それぞれの液体は記録情報に応じて個別に吐出され、被記録媒体上に着弾する。前述のように、このような構成をとることによって、最初に図２で説明したＢｋ用ヘッドタンク一体カートリッジから画質向上液が吐出され、続けてＹ，Ｍ，Ｃ各色インクが被記録媒体上の同一画素上に着弾する。

【００３８】本実施例においては、先に説明したようにＢｋインク、画質向上液、イエローインク、マゼンタインク、シアンインクの５種類のインク（液体を吐出する構成となっているが、ここで、Ｂｋインクと画質向上液を吐出するためのヘッドは１つのユニットに形成され装置に対して着脱交換可能なインクジェットカートリッジとして構成されているとともに、イエローインク、マゼンタインクおよびシアンインクを吐出するためのヘッドも同様に１つのユニットに形成され装置に対して着脱交換可能なインクジェットカートリッジとして構成されている。なぜならば、まずＢｋインクと画質向上液を吐出するためのヘッドは他のインクを吐出するためのヘッドに比べ使用頻度が格段に高い。したがって、これらのヘッドがすべて一体のユニットに設けられている場合には、イエローインク、マゼンタインクおよびシアンインクを吐出するためのヘッドがまだ使用可能な状態でＢｋ

インクまたは／及び画質向上液を吐出するためのヘッドの寿命がきてしまい、すべてのインクを吐出するヘッドを交換しなければならなくなる。一方、寿命がきたヘッドだけ交換できるように各インクを吐出するヘッド毎に交換可能にした場合には、このヘッド毎に所定数の装置に対して電気的に接続する配線パッドが必要となり、配線パッドの数が各ヘッドを一体に構成したときに比べ増大してしまいキャリッジ上の電気コンタクト部の面積も増大し、キャリッジが大型化してしまう。また、配線数も増えるため配線抵抗が増大し、電力損失も生じることとなる。もちろんキャリッジが各ヘッド毎に装着機構を有することになるため、このこともキャリッジの大型化を招いてしまう。

【００３９】したがって、本実施例のように少なくともＢｋインクと画質向上液を吐出するためのヘッドを１つのユニットに形成し装置に対して着脱交換可能なインクジェツトカートリッジとすることにより、キャリッジの大きさをそれほど大きくすることなく、使用頻度の高いヘッド部分のみを交換可能にすることができるものである。また、イエローインク、マゼンタインクおよびシアンインクを吐出するためのヘッドに関しても、これらヘッドを一つのユニットに形成し装置に対して着脱交換可能なインクジェットカートリッジとすることが好ましい。尚、本実施例ではＢｋ、画質向上液以外のインクとしてはイエローインク、マゼンタインクおよびシアンインクが挙げられているが、本発明はこれに限られることなく、４色以上のインクタンクを有する場合や各色につき濃淡を有する場合であっても好適に用いられる。そして、このような場合はＢｋ、画質向上液以外のすべての色を吐出するためのヘッドを一体に形成する必要はなく、適宜複数個のカートリッジに分割することができる。

【００４０】また、このようなインクジェットカートリッジにおいてインクタンク部についはインクジェットカートリッジから分離可能となっていても良く、この場合各カートリッジ毎に一体の形態であっても各インクを保持するインクタンク毎が独立に分離可能となっている形態であってもよい。

【００４１】（実施例２）図４は、濃淡カラー用インクジェット記録ヘッドと濃淡カラーインクタンクの斜視図である。これらの濃淡カラー用インクジェット記録ヘッドと濃淡カラーインクタンクは、図１におけるカラーインクタンク１２と合体したカラー用ヘッド１３と、それぞれ互いに交換して使用されるものであり、より高画質の写真調の画像を再現する場合には本図４にて説明する濃淡インクを用いて印刷する方法が用いられる。

【００４２】図４において、４１は、記録液滴を吐出するための複数のノズル及びオリフィスが２列、内部に形成された１個の天板と、記録液滴を吐出するためのエネルギー発生部である複数の発熱用ヒータが形成された２個のヒータボードと、このヒータボードを天板に固定する２個の固定用ばねとが一体的に組み立てられた吐出チップである。

【００４３】４２は、内部にイエロー濃インク，イエロー淡インク，マゼンタ濃インク，マゼンタ淡インク，シアン濃インク，シアン淡インクの６色インクを内蔵し、保持する一体的に形成された濃淡カラーインクタンクである。４３は、濃淡カラーインクタンク４２が着脱されると共に、濃淡カラー用インクジェット記録ヘッドがねじまたは熱かしめにより互いに一体的に固定されているインクタンクホルダである。

【００４４】Ｃインク，Ｍインク，Ｙインクの順に図中の手前側から濃淡カラーインクタンク４２内に各色インクが内蔵されており、さらにＣ，Ｍ，Ｙそれぞれが濃淡２種のインクで構成されることで色再現領域が拡大し、写真調の高画質を再現することが可能となる。この際、写真調の画像ではハイライト部の色再現が多くなるため、淡インクの使用量が濃インクの使用量に比べ多くなり、Ｙ，Ｍ，Ｃ各色濃淡の６種のインクを同一タンク内に内蔵する場合には、淡インクをより多量に内蔵することが必要となる。従って、図４では、図中の右部に淡インク、左部に濃インクを配置し、各色の淡インクを各色の濃インクの２倍保持するような構成にしている。

【００４５】濃淡インクタンク４２をインクタンクホルダ４３内に装着することで以上の６種のインクは吐出チップ４１内に連通し、吐出チップ４１内の図中の奥側の３色分離された液室にＹ，Ｍ，Ｃ濃インクが導かれ、図中の手前側の３色分離された液室にＹ，Ｍ，Ｃ淡インクが導かれる。４４は、Ｙ，Ｍ，Ｃ各色の淡インクが吐出する一列のオリフィス列であり、４５は、Ｙ，Ｍ，Ｃ各色の濃インクが吐出する一列のオリフィス列であり、それぞれの液体は記録情報に応じて個別に吐出され、被記録媒体上に着弾する。

【００４６】前述のように、このような構成をとることによって、最初に図２で説明したＢｋ用ヘッドタンク一体カートリッジから画質向上液が吐出され、続けてＹ，Ｍ，Ｃ濃淡の各色インクが被記録媒体上の同一画素上に着弾する。

【００４７】以上のような構成において、吐出チップ４１内には、記録装置内での位置決め基準が設けられている。装置本体内部で記録ヘッドが記録装置と最初に接触する位置、すなわち吐出チップ４１のタンク装着方向前部には、淡インクオリフィス列４４と濃インクオリフィス列４５との前後方向の位置決め基準４６が設けられている。位置決め基準４６と淡インクオリフィス列４４と濃インクオリフィス列４５とが、吐出チップ４１に共に形成されていることで、複数オリフィス列が精度良く固定されることになる。

【００４８】前述のように、Ｙ，Ｍ，Ｃ各色が淡インク、濃インクの２種用いられている場合、吐出チップ４

１から６個のインクジョイント部がインクタンクホルダ４３内に連通し、形成される。吐出チップ４１がタンク装着方向前部に位置していることから、必然的に６個のインクジョイント部も装着方向前部に位置することになる。また前述のように、各色の淡インクが各色の濃インクの２倍保持されているような構成の場合、容量の少ないインク種を図の左方のインクタンク装着方向の前部に、容量の多いインク種を図の右方のインクタンク装着方向の後部に配置させ、容量の多いインク種のインク供給口を容量の少ないインク種のインク供給口近傍に配置させることで、全体的にインク供給系を短く、効率良く配置することができる。

【００４９】図５は、インクタンクホルダ４３の斜視図であり、図５では一例として、図４に示した濃淡カラーインクジェットヘッド用のインクタンクホルダを示している。図５に示すホルダに図４のインクタンク４２が着脱されるが、図５において、５１はインクタンクの接合部を覆うジョイント部であるゴムシール部材であり、インクタンク接合時の気密を保持する機能を持つ。５２は各フィルタである。

【００５０】前述実施例１の図３のカラーインクタンク３２、実施例２の図４の濃淡カラーインクタンク４２、図２のＢｋインク及び画質向上液を内蔵するインクタンク２２の各外装部材は、気体透過性の低いポリプロピレンの成形体で構成されており、上記のゴムシール部材との併用により、長期放置によるインクの蒸発を防止することができる。

【００５１】（実施例３）なお以上のような実施例１，２において、Ｃ，Ｍ，Ｙ３色のカラー用インクタンク３２用と、濃淡６色カラー用インクタンク４２用のインクタンクホルダ４３との要部は設計上、実質的に共通となっているのが通常であるが、もしも利用者が、所定のインクタンクホルダに別のインクタンクを誤装着して印字動作を行うと、当然所定の印字品質が得られず、あるいは、早期のインク量の消耗などの支障を来すことになる。

【００５２】本実施例は、この種のインクタンクの誤装着を自動的に防止するため手段を付加したもので、図６及び図８，９にそれぞれ前記図３及び図４，５相当図を示す。

【００５３】本実施例の特徴は、それぞれ図６～９に示すようにつぎのような誤挿入防止手段を設けたものである。

【００５４】（１）３色用カラーインクタンク２００Ａとインクタンクホルダ１００Ａ（図６，７）

１）３色インクタンクホルダ１００Ａの後端に２個所の突起１０７を設け（図７）、インクタンク２００Ａの後端に２個所の溝２１１を設けて前記突起１０７を逃げるようにした（図６）。

【００５５】２）インクタンクホルダ１００Ａの前端に

は、インクタンク２００Ａの先端部の２個所の凸部２０５（図６）が嵌合する穴１２０を２個所設けた（図７）。

【００５６】（２）濃淡６色用カラーインクタンク２００Ｂとインクタンクのホルダ１００Ｂ（図８，９）

１）インクタンクホルダ１００Ｂの前方内側の供給口近傍に突起１０６を設け（図９）、インクタンク２００Ｂの前方両側に切欠き２１０を設けて、前記突起１０６を逃げるようにした（図８）。

【００５７】２）インクタンク２００Ｂの先端３個所に凸部２０５を設け（図８）、タンクホルダ１００Ｂの前端には、前記各凸部２０５の入る相補の穴１２０を３個所設けた（図９）。

【００５８】以上のような構成により

（１）３色インクタンク２００Ａを６色インクタンクホルダ１００Ｂに挿入しようとすると、このホルダ１００Ｂに設けられた突起１０６にタンク２００Ａが当接して挿入できない。このとき供給口近傍に設けられた突起１０６は供給口よりも高く形成されているためタンク２００Ａが供給口に接触して供給口を破損することを防止できる。

【００５９】（２）逆に６色インクタンク２００Ｂを、３色インクタンクホルダ１００Ａに挿入しようとすると、ホルダ１００Ａの後端突起１０７にタンク２００Ｂが当接して挿入できないと共に、ホルダ１００Ａの各穴１２０が２個しかないので、中央の先端凸部２０５がホルダ３００Ａに当接して挿入できない。

【００６０】以上のような構成により、３色／６色各タンクの相互のホルダ誤挿入を防止することができる。

【００６１】なお、本実施例３においては、各インクのホルダへの誤挿入防止手段として、それぞれのタンク及びホルダの前後部に、それぞれ特定の相補の凸部と穴形状等を利用した事例について説明したが、これらの手段は、これのみに限定されるものでなく、他の各種の形状の組合せを使用しても差し支えないことは勿論である。

【００６２】

【発明の効果】以上説明したように、本発明によれば、画質向上液を用いることにより、広範囲の種類の記録媒体上において発色性、記録濃度、定着性、耐水性、耐候性などの画像特性を向上させることが可能となった。加えて、画質向上液を普通紙上の画素に最初に吐出させ、続けて着色成分を含むインクが同一画素上に吐出されること、すなわち常に画質向上液が転写された面上に色剤を含むインクが着弾することで、各色形成時に、各色において一様な画像特性を得ることが可能となった。

【００６３】また、少なくともＢｋインクと画質向上液を吐出するためのヘッドを１つのユニットに形成し装置に対して着脱交換可能なインクジェッカートリッジとすることにより、キャリッジの大きさをそれほど大きくすることなく、使用頻度の高いヘッド部分のみを交換可能

にすることができる。

【００６４】さらに、濃淡インクを用いて写真調の高画質を再現する際に、淡インク量を濃インク量より多量とすることで濃淡一体タンク使用時の稼働コストを低減させることが可能となった。また、インクタンクの外装部材は、気体透過性の低いポリプロピレンの成形体を使用しジョイント部のゴムシール部材との併用により、長期放置によるインクの蒸発を防止することが可能となった。

【００６５】また、例えば３色及び濃淡６色インクタンクの各ホルダ誤装着の可能性が未然に防止されるため、常に所定の印字効果が得られる。

【図面の簡単な説明】

【図１】　一実施例のインクジェット記録ヘッド及びインクタンクの配置斜視図

【図２】　Ｂｋ用ヘッドタンク一体カートリッジの斜視図

【図３】　実施例１のカラー用インクジェット記録ヘッドとカラーインクタンクの斜視図

【図４】　濃淡カラー用インクジェット記録ヘッドと濃淡カラーインクタンクの斜視図

【図５】　実施例２のインクタンクホルダの斜視図

【図６】　実施例３の図３相当図

【図７】　実施例３のインクタンクホルダの斜視図

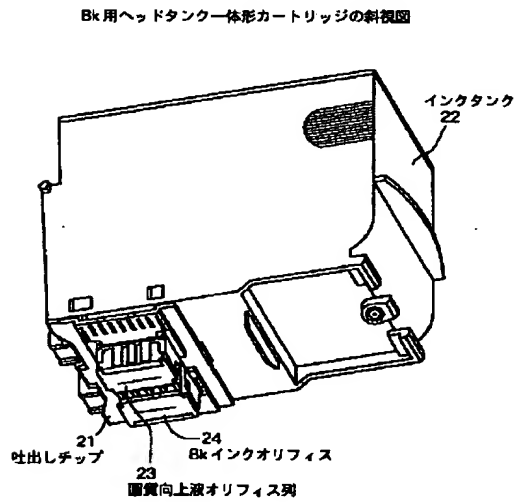
【図８】　実施例３の図４相当図

【図９】　実施例３の図５相当図

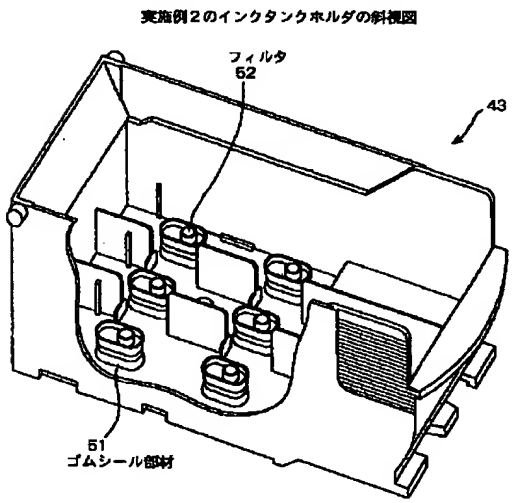
【符号の説明】

１１　Ｂｋ用ヘッドタンク一体カートリッジ
１２　カラーインクタンク
１３　カラー用インクジェット記録ヘッド
１４　キャリッジ
１５　ヘッド回復ユニット
１６　記録用紙が搬送される給紙面
２１　吐出チップ
２２　インクタンク
２３　画質向上液専用のオリフィス列
２４　Ｂｋインク専用のオリフィス列
３１　吐出チップ
３２　カラーインクタンク
３３　インクタンクホルダ
３４　Ｙ，Ｍ，Ｃ各色インクが吐出する一列のオリフィス列
４１　吐出チップ
４２　濃淡カラーインクタンク
４３　濃インクタンクホルダ
４４　Ｙ，Ｍ，Ｃ各色の淡インクが吐出する一列のオリフィス列
４５　Ｙ，Ｍ，Ｃ各色の濃インクが吐出する一列のオリフィス列
５１　ゴムシール部材
５２　フィルタ
１００Ａ　３色インクタンクホルダ
１００Ｂ　６色インクタンクホルダ
１０６　突起
１０７　後端突起
１２０　穴
２００Ａ　６色インクタンク
２００Ｂ　６色インクタンク
２０５　先端凸部
２１０　切り欠き
２１１　溝

【図２】

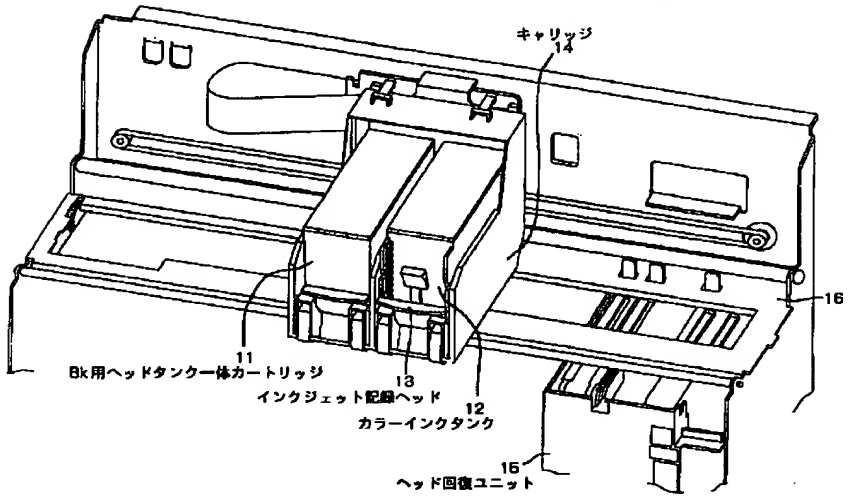


【図５】



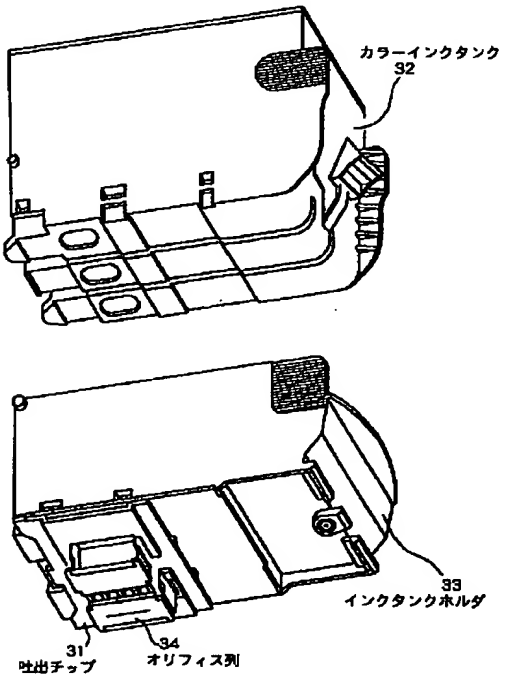
【図１】

一実施例のインクジェット記録ヘッド及びインクタンクの配置斜視図



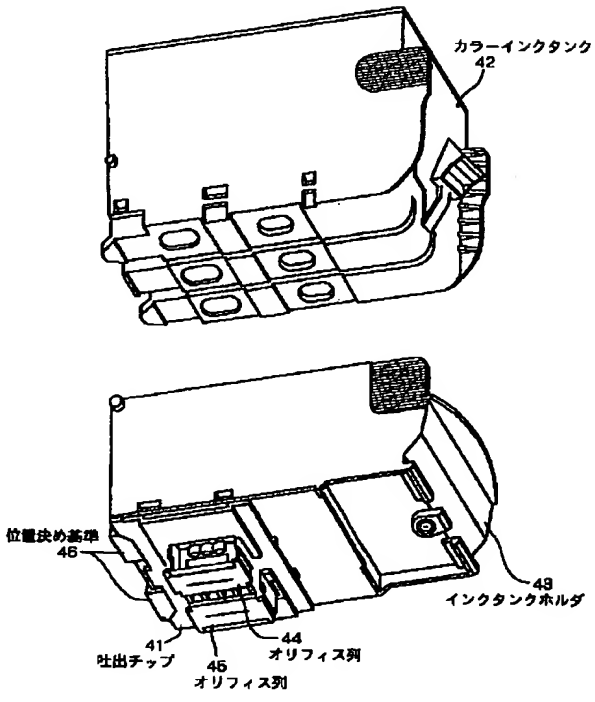
【図３】

実施例１のカラー用インクジェット記録ヘッドとカラーインクタンクの斜視図

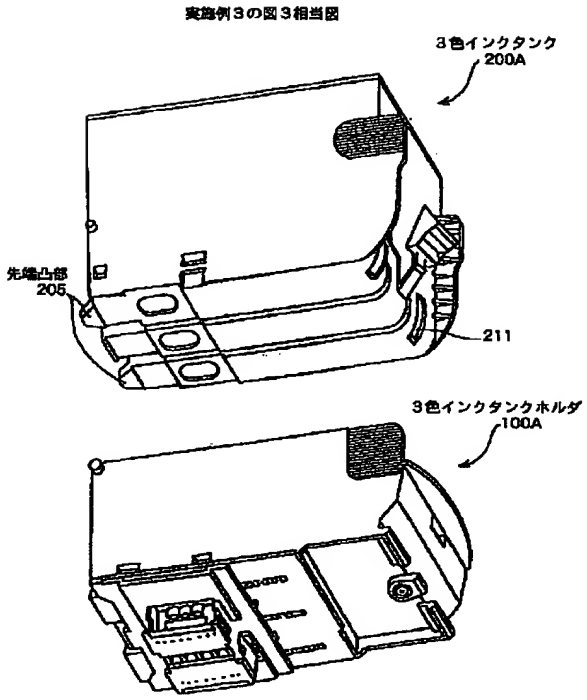


【図４】

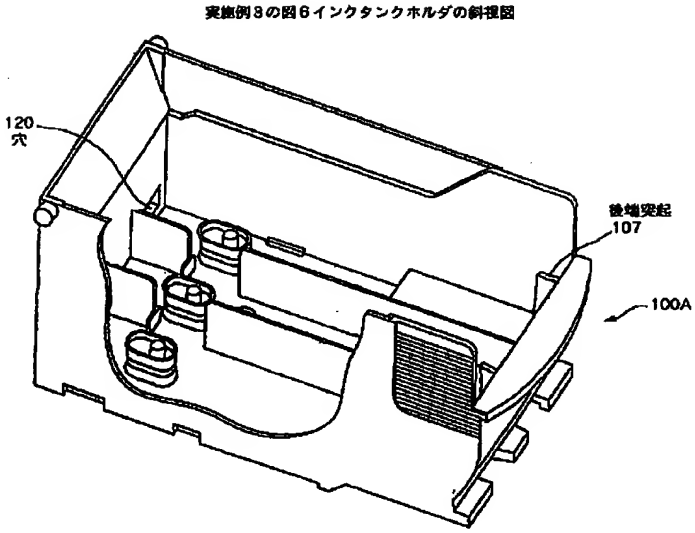
実施例２の濃淡カラー用インクジェット記録ヘッドと
濃淡カラーインクタンクの斜視図



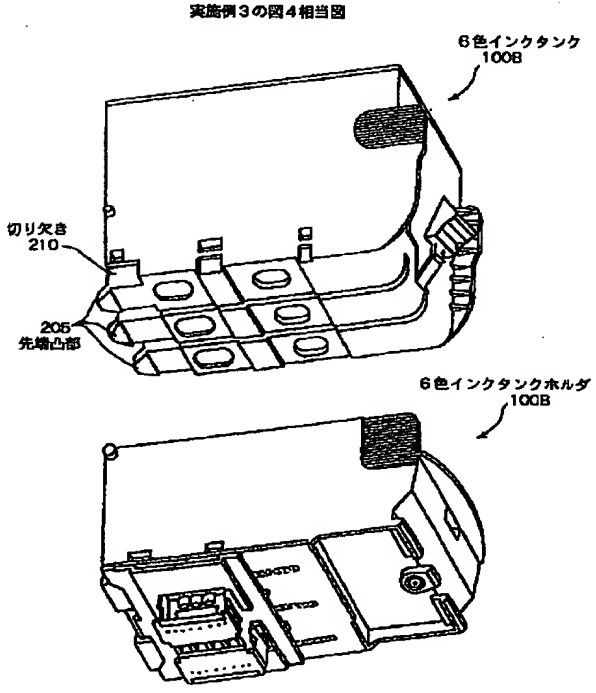
【図６】


実施例３の図３相当図
３色インクタンク
200A
先端凸部
205
211
３色インクタンクホルダ
100A

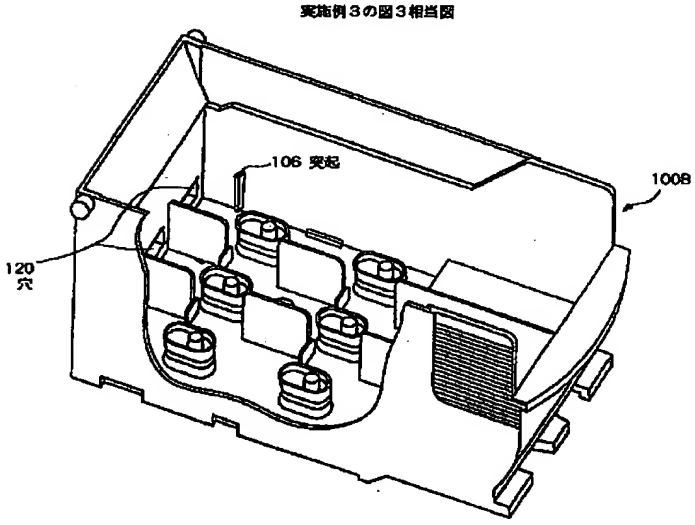
【図７】


実施例３の図６インクタンクホルダの斜視図
120
穴
後端突起
107
100A

【図８】


実施例３の図４相当図
６色インクタンク
100B
切り欠き
210
205
先端凸部
６色インクタンクホルダ
100B

【図９】


実施例３の図３相当図
106 突起
100B
120
穴